Public Health Service Rationing for Elective Surgery in New Zealand: 2004-2007

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Abstract

The New Zealand health system is two-tiered with elective treatments are performed by both publicly funded state hospitals and by private hospitals. Publicly funded operations are rationed using a prioritisation system which was introduced in 1998 to curtail expanding waiting lists for elective surgery. One of the aims of the new booking system was to generate national tools for prioritising patients in order to improve the equality of access to public elective surgery throughout New Zealand. However, priority scoring systems were not implemented in a consistent manner and access to elective surgery remains very unequal. Despite large media attention and a high public profile, waiting times have attracted little research in medical geography or within the wider social sciences community. The subject has been partly reserved for public health commentators within the medical field, who have found that variation in waiting times has much to do with the referral practices of physicians, the management of waiting lists by District Health Board (DHB) staff and the amount of private practice that occurs within each district. Most notably several studies have identified that in areas associated with high private admissions, patients tend to suffer higher waiting times for the same procedures in the public hospital system.

This study examines the performance of the New Zealand Booking System (NZBS) during the years 2004 to 2007 to assess the equitable delivery of publicly funded elective surgery procedures. Waiting times (NBRS) and admissions (NMDS) datasets were sourced from the New Zealand Health and Information Service (NZHIS) of The Ministry of Health. Mean and Median waiting times were compared spatially between each of New Zealand's 21 DHBs, compared with Australian waiting times and then broken down into five common medical specialties. Waiting times were then analysed by ethnicity, level of material deprivation and other individual factors using data from the 2006 New Zealand Census. Finally, rates of admissions were calculated for the public and private hospital sectors during the study period. These were used to correlate waiting times results with the amount of private practice in each DHB. ACC cases were extracted from the dataset to avoid bias in waiting times as much of this work is contracted out to the private sector and not subject to lengthy waiting times for treatment. A number of medical specialists and hospital administrators were interviewed to discuss results, explain prioritisation tools and management practices.

Results showed large variations in the median waiting times of New Zealand DHBs. A north south gradient is observed in which southern DHBs suffer longer waits for care. Vastly better results were observed for Australian public hospitals than those seen in New Zealand. For waiting times as determined by individual factors, Maori and Pacific Island patients and those from lower socio-economic backgrounds suffered longer waiting times nationwide although, in certain DHBs inequalities for access to elective surgery were exacerbated. However, ethnic differences were more pronounced than socio-economic variations. Admissions results showed significant positive correlations between the amount of private practice and the waiting times experienced in each DHB which are supported by previous research. Feedback from interviews confirmed inconsistency in the use of scoring tools, manipulation occurring on behalf of the DHB management to achieve performance goals set by the Ministry of Health and provided some further explanation of the other quantitative results. Access to elective surgery is determined partly by location of residence, ethnicity, deprivation and where hospital resources are located but most importantly by the willingness to pay for treatment within the private hospital sector and the ability to manipulate the public prioritisation system.

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ACA	Assessment criteria for first specialist assessment
ACC	Accident Compensation Corporation
AMA	Australian Medical Association
AR	Active review
ASR	Age specific rate
aTT	Actual treatment threshold
BMANZ	British Medical Association of New Zealand
CAU	Census area unit
CR	Crude rate
CSC	Core Services Committee
CHE	Crown Health Enterprises
CLT	Clinical threshold
CT	Commitment threshold
CPAC	Clinical priority assessment criteria
DHB	District Health Board
FFS	Fee-for-service
FSA	First surgical assessment
FST	Financially sustainable threshold
GIS	Geographic Information Systems
GP	General Practitioner
GMS	General medical services
GNP	Gross national product
HFA	Health Funding Authority
HHS	Hospital and Health Services

HMO	Health Maintenance Organisations
MoH	Ministry of Health
IPA	Independent Practitioner Association
NBRS	National booking reporting system
NMDS	National minimum dataset
NPM	New public management
NZBS	New Zealand Booking System
NZ Dep	New Zealand deprivation index
NZPSHA	New Zealand Private Surgical Hospitals Association
NHI	National health index
NZHIS	New Zealand Health Information Service
OECD	The Organisation for Economic Co-operation and Development
PCO	Primary care organisation
PHC	Primary health care
PHO	Primary Health Organisation
RWL	Residual waiting list
RHA	Regional Health Authority
SES	Socio-economic Status
SIF	New Zealand Social Infrastructure Fund
TJR	Total joint replacement
TT	Treatment threshold
UK	United Kingdom
US	United States
WGS	World Geodetic System
WW2	The second world war

Acknowledgements

I had not envisaged returning to study in 2010-11. 2009 was a very turbulent period of my life which changed as a result of a benign brain tumour (cavernoma) which was diagnosed in June and later removed on August 5th, a day that will forever be imbedded in my memory. The latter challenges which emerged including a complete loss of speech and some degeneration of cognitive skills. After the first month or so I had regained the ability to speak but was still feeling slow as a result of the brain trauma and swelling post-surgery. In November I emailed Ross Barnett to see if returning to university was a possibility to undertake my masters in the thought that this could help the recovery process. I would like to thank Ross for an encouraging initial response which inspired me to leave the army and return to Christchurch just 7 months after my operation to begin this thesis. I will also be forever grateful especially to Ales, Hazem, Deanna, and the rest of the team from the Neurosurgery Ward on the 7th Floor of Wellington Hospital for the support and tireless work in the months following my operation.

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1 Introduction

"If you believe that health care is a public good to be guaranteed by the state, then a single-payer system is the next best alternative. Unfortunately, it is fiscally unsustainable without rationing." (Krauthammer, 2009)

1.1 Introduction

The way health care is administered varies widely between western countries depending on social, cultural, political and economic history. Specific goals of health systems determine how governments choose to allocate welfare resources amongst western societies. Some, offer universal health care systems in which patients receive fully subsidised treatment in public hospitals. Others choose to rely almost entirely on private markets to deliver an efficient allocation of health resources. These contrasting models of provision each represent particular goals of governments, the recent being one of efficiency and the former searching for equitable provision and for the best outcomes across society. Over time political pressures faced with the rising cost of medicine have forced governments to adapt to popular demands and restructure health care systems according to goals of equity, efficiency and effectiveness (Blank and Burau, 2007).

Many western health systems have developed out of the Keynesian welfare state in which governments have provided comprehensive public provision of health services (Pinch, 1997). However, since the challenges of the 1970s state fiscal crises - governments have had to focus on goals of efficiency as a response to growing public demands and increasing expenditure on health care services. Krauthammer (2009), for example, has noted that in comprehensive health care systems that guarantee wide public access to hospital care, the rationing of services is somewhat unavoidable. Health service rationing is widely practiced by western countries that provide a comprehensive array health care services, especially in single payer systems such as New Zealand, the United Kingdom and Canada (Freeman, 2000). The need to ration reflects the reality that government resources are scarce and a limit has to be placed on the amount of health services that can be practiced through the state. Shortages in the supply and uneven distribution of hospital resources are all too common in western societies. Governments have often placed an emphasis on equity of access to health services according to particular population needs (Scarpaci, 1989).

However, an unequal distribution of hospitals and other health care resources inevitably means that inequalities arise in access to treatments.

1.2 National Context

In New Zealand, inequalities are especially relevant in the market for 'elective' treatments where the state funds around 50% the cost of such procedures. The other half is funded through private contributions to health insurance schemes and other private sources and these procedures are carried out by private hospitals (Moore, 2011). Elective treatments, such as joint replacements, cataract removal or varicose vein surgery, are hospital services for people who do not require immediate medical treatment (MoH, 2011). The public hospital system administers a prioritisation system for the delivery of elective services in which patients are forced to wait in line for treatment. Patients have been known to spend anywhere from 10 days to 24 months on these waiting lists, and some people never receive treatment for their conditions (Gauld and Derrett, 2000). Patients are often led to exit the public hospital sector to take up treatment in private hospitals at their own expense (Fougere, 1974). In New Zealand the poor and middle classes are serviced by an under-resourced public hospital system while affluent patients enjoy hotel-like private hospital facilities without the wait that is experienced by users of the public hospital system (Kearns et al., 2003).

Waiting lists have been a matter of public concern in New Zealand for many years. The ability of the public hospital sector in New Zealand to deliver elective treatments has been widely scrutinised throughout the media and has always been a politically sensitive topic of debate. Throughout the 1980s and 90s public hospital waiting lists increased substantially which contributed towards political pressure for reform within the health sector (Gauld and Derrett, 2000). This led to the introduction of a new 'booking system' in 1998 which promised a more equitable way of prioritising patients for surgery along with the reduction of lengthy public hospital waiting times (McLoed et al., 2004). The booking system provides prioritisation criteria to gain access to elective surgery which has meant many thousands of patients were dropped from waiting lists during the following period and fewer would become eligible for surgery in the future (Roake, 2003). While this achieved the political goal of reducing waiting lists, there was little improvement in throughput in the delivery of elective treatments. The booking system merely acted as a process to ration patients away from the

public hospital sector as Shaw (2006) points out: "*The Government's health system 'waiting list initiative' is nothing more than rationing."*

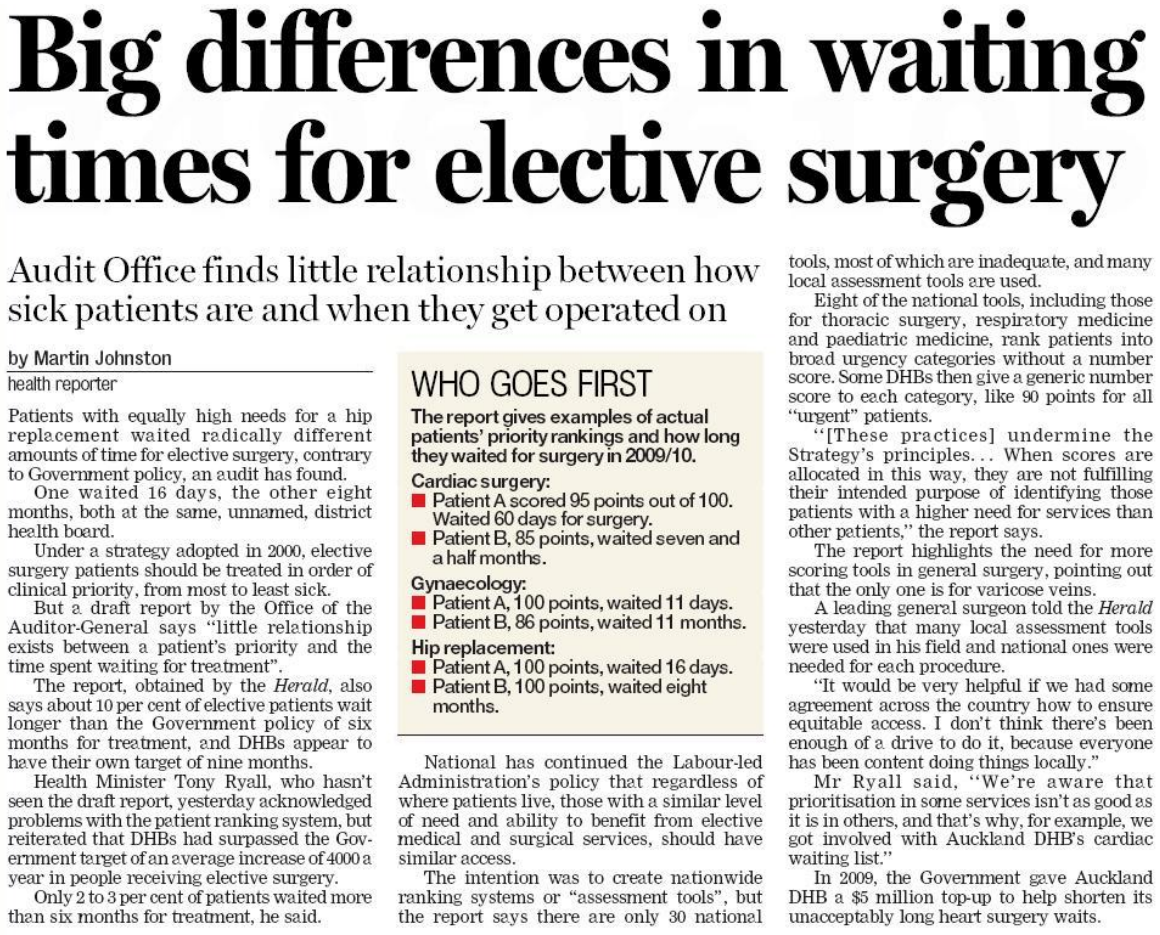
Directly following the introduction of the booking system feedback through the media and physicians widely discredited the success of such a system. Some newspaper article headings read:

- "Waiting times project fails to convince GP's" (Hill, 1998)
- "New booking system a scam, says surgeon" (Hoby, 1998)
- "Surgery booking system 'has flaws'" (Keene, 1999)
- "Surgeon slams new booking system" (McNeil, 1999).

In the years following the introduction of the booking system the waiting times blew out as public hospital providers adjusted to new waiting time targets that were specified by the New Zealand Ministry of Health. There have been many reports and political implications around lengthy waits with some found to have died while awaiting surgery for operable conditions. Two newspaper article headings read:

- "Man fears death waiting for op" (Guyan, 1998)
- "Waiting heart deaths cause political heat" (Stuff, 2003)
- "Willie Jackson refuses to die waiting" (Press Release, 2008).

By 2010 *District Health Board* (DHB) providers of health and disability services had restricted entry into the booking system to make sure they could treat patients within the six month guideline given by the Ministry of Health (Ministry of Health, 2010a). This has been achieved via two methods; firstly by tightening GP referral practices and then by increasing the prioritisation score that is required to proceed to surgery. In reality, access to elective services has reduced nationwide, but the big question remains whether access differs spatially between DHBs and also between different population groups in New Zealand. Figure 1 suggests that there are large inequalities in patients' access to elective treatments within the public hospital system. The spatial differences have been put down to a lack of consistency between the use of prioritisation criteria as was originally proposed in the enactment of the New Zealand Booking System (NZBS), but it remains unclear whether certain groups of the population suffer poorer access than others.



Big differences in waiting times for elective surgery

Audit Office finds little relationship between how sick patients are and when they get operated on

by Martin Johnston
health reporter

Patients with equally high needs for a hip replacement waited radically different amounts of time for elective surgery, contrary to Government policy, an audit has found.

One waited 16 days, the other eight months, both at the same, unnamed, district health board.

Under a strategy adopted in 2000, elective surgery patients should be treated in order of clinical priority, from most to least sick.

But a draft report by the Office of the Auditor-General says "little relationship exists between a patient's priority and the time spent waiting for treatment".

The report, obtained by the *Herald*, also says about 10 per cent of elective patients wait longer than the Government policy of six months for treatment, and DHBs appear to have their own target of nine months.

Health Minister Tony Ryall, who hasn't seen the draft report, yesterday acknowledged problems with the patient ranking system, but reiterated that DHBs had surpassed the Government target of an average increase of 4000 a year in people receiving elective surgery.

Only 2 to 3 per cent of patients waited more than six months for treatment, he said.

WHO GOES FIRST

The report gives examples of actual patients' priority rankings and how long they waited for surgery in 2009/10.

Cardiac surgery:
- Patient A scored 95 points out of 100. Waited 60 days for surgery.
- Patient B, 85 points, waited seven and a half months.

Gynaecology:
- Patient A, 100 points, waited 11 days.
- Patient B, 86 points, waited 11 months.

Hip replacement:
- Patient A, 100 points, waited 16 days.
- Patient B, 100 points, waited eight months.

National has continued the Labour-led Administration's policy that regardless of where patients live, those with a similar level of need and ability to benefit from elective medical and surgical services, should have similar access.

The intention was to create nationwide ranking systems or "assessment tools", but the report says there are only 30 national tools, most of which are inadequate, and many local assessment tools are used.

Eight of the national tools, including those for thoracic surgery, respiratory medicine and paediatric medicine, rank patients into broad urgency categories without a number score. Some DHBs then give a generic number score to each category, like 90 points for all "urgent" patients.

"[These practices] undermine the Strategy's principles... When scores are allocated in this way, they are not fulfilling their intended purpose of identifying those patients with a higher need for services than other patients," the report says.

The report highlights the need for more scoring tools in general surgery, pointing out that the only one is for varicose veins.

A leading general surgeon told the *Herald* yesterday that many local assessment tools were used in his field and national ones were needed for each procedure.

"It would be very helpful if we had some agreement across the country how to ensure equitable access. I don't think there's been enough of a drive to do it, because everyone has been content doing things locally."

Mr Ryall said, "We're aware that prioritisation in some services isn't as good as it is in others, and that's why, for example, we got involved with Auckland DHB's cardiac waiting list."

In 2009, the Government gave Auckland DHB a $5 million top-up to help shorten its unacceptably long heart surgery waits.

Figure 1: Herald Newspaper Article on Waiting Times for Elective Surgery (Johnston, 2011a)

Surgical interventions are provided in both the public and private sectors in New Zealand. While the public sector provides a wide range of emergency, acute and elective services, the private sector specialises in the provision of elective treatments. Private hospitals have based their marketing on the deficiencies of the public hospital sector and promised no waiting time for their services. When patients are denied access to treatment in the public sector often their only choice is to go private funding through private payments or through insurance contributions (Fougere, 1974). Lower socio-economic groups are less likely to be able to afford private treatments. Therefore, the private hospital sector has traditionally catered for more affluent patients, compared to poorer patients who are more likely to be dependent upon the public hospital system (Besley et al., 1994).

1.3 Academic Context

Despite evidence of differing access to elective services in New Zealand, until recently, there have been few studies monitoring spatial differences or localised inequalities in access to these treatments. To the author's knowledge, few geographers have attempted to interpret these differences before. Research on the development and recent performance of the NZBS has been undertaken only by those from medical and public health disciplines (Derrett et al., 2009, Derrett et al., 2003, Gauld and Derrett, 2000, McLoed et al., 2004, Newdick and Derrett, 2006, Roake, 2003). Derrett et al (2009) have made a particularly large contribution towards understanding regional differences in access, the effects of private interaction in the market for hospital services and the differences in access experienced by deprived communities. Twenty years prior to Derrett et al's (2009) study, Barnett and Barnett (1989) published work on privatisation of hospital systems and found that higher private hospital admissions were associated with longer waiting lists in the public hospital sector.

Health geographers have often focused on wider issues of social policy, resource allocation, rationing, equity and access, restructuring of health systems and health outcomes. Social policy debates have been aligned with analysis of the welfare state (Mohan, 2003, Boston et al., 1999, Fougere, 1984, Joseph and Flynn, 1988, Moran, 1994). Hospital resource allocation has been discussed using measures of bed supply and surgical facilities. Intertwined with resource allocation are practices of rationing hospital services that have been of interest to health geographers in recent years (Moon and Brown, 2001, Mohan and Gorsky, 2001, Gatrell, 2002, Ham and Robert, 2003, Mechanic, 1997, Mohan, 2002). With health service rationing come issues of equity and inequalities in which hospital access has been widely discussed (Oliver and Mossialos, 2004, Panelli et al., 2005, Raymont, 2001).

Geographers have long examined theories of inequality and exclusion in relation to environmental risk and other related vulnerabilities. They have also found in many cases that people living in relatively deprived circumstances suffer higher levels of morbidity and mortality compared to the remainder of society (Dew and Kirkman, 2007a). Some have shown that these individuals suffer poorer access to health services, in particular Primary Health Care (Barnett and Lauer, 2003). Much of the analysis takes account of the income effect that limits patient access to PHC services, specialist consultation and private hospital treatments (Schoen et al., 2000). Geographers have also looked at the way that Maori and Pacific Islanders also suffer less access to health services due to falling into these lower

socio-economic groups (Brown, 1999) and tend to suffer higher levels of morbidity when compared to the remainder of the New Zealand population (Salmond and Crampton, 2000).

Restructuring has been a central theme throughout debate concerning health service access with processes such as privatisation, rationalisation and public management theories scattered throughout the literature (Moon and Brown, 2001, Mohan, 2002, Barnett, 1999, Barnett, 2000a, Barnett, 2000b, Barnett and Barnett, 2003a, Barnett and Barnett, 2005, Gauld, 2009, Kearns and Moon, 2002, Mohan, 1995a, Scarpaci, 1989). Geographers have also documented the health outcomes that have been derived from these policies. Health outcomes have been measured by morbidity and mortality rates. Inequalities have been found for particular groups of the New Zealand population, specifically low socio-economic groups and ethnic minorities (Brown, 1999, Salmond and Crampton, 2000, Barnett and Lauer, 2003, Glover et al., 2004, Pearce et al., 2006) .

Regarding research into interactions between the public and private sector, health geographers have commented on changes that have taken place within each sector but few have analysed the effects of private health care on public hospital resources. The only known geographers in New Zealand to examine such topic are Barnett and Barnett (1989). Fougere (2001, 1974), a sociologist, has looked at the way patients exit the private health system to receive no waiting services and the detrimental effect that this has had on the public hospital system. Others outside geography have looked closely at this phenomenon, although, some disagree and consider the private hospital sector takes pressure off public hospitals (Di Matteo, 2000, Duckett, 2005, Howden-Chapman and Ashton, 2000, McTurk, 1998, Rankin, 1998, Vaithianathan, 1999).

1.4 Purpose

The main purpose of this thesis is to identify differences in access to publicly funded treatments and to measure the effect of private practice on the provision of public services. The focus of this thesis is to analyse how waiting times vary and determine factors that contribute to poor access experienced by some groups.

1.5 Aim and Objectives

The main aim of this thesis is to determine the performance of New Zealand's Surgical Booking System in delivering access to elective surgery and to examine the extent to which private sector involvement is influencing public surgical waiting times.

The aim will be achieved by meeting three objectives. These are:

1. To observe the performance of the NZBS and to assess how the length of waiting times varies geographically.

2. To investigate how public surgical waiting times vary between different sub groups of New Zealand's population.

3. To examine contextual factors, specifically whether the provision of privately funded elective surgery is affecting public surgical waiting times.

1.6 Thesis Structure

This thesis is comprised of nine chapters and the structure is illustrated in Figure 2. Following this introductory chapter, Chapters 2-4 will establish the theoretical base for the analysis that will follow in later chapters. Chapter 5 will outline the methods used to undertake analysis throughout the remainder of the thesis. Chapters 6-8 will present the results and will be followed by Chapter 9 which will provide discussion and conclusions. Each of the chapters will now be discussed in more detail.

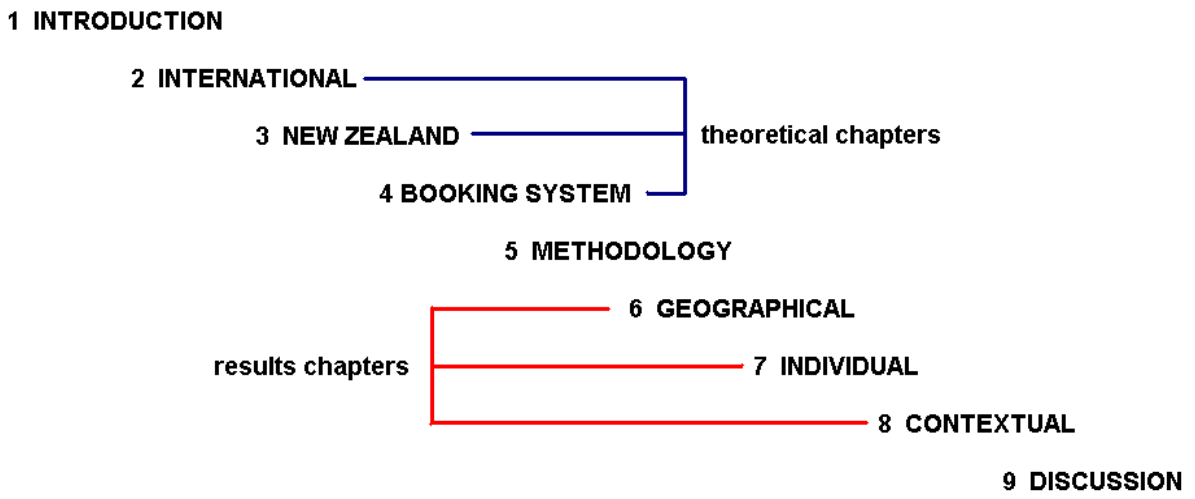


Figure 2: Thesis Structure

Chapter 1 has provided an introduction to health systems and the location of the provision of elective surgery within the New Zealand hospital sector. It then introduced the reader to the academic context of this thesis and the purpose, aims and objectives were stated.

The purpose of Chapter 2 is to is to establish the context of the thesis in the wider international literature on hospital systems. The evolution of hospital systems throughout western societies is discussed. The goals of health systems are introduced, of which equity, efficiency and effectiveness are framed as key concepts. These will be revisited throughout the thesis. The adoption of welfare policies by western countries is then illustrated showing that public health policy differs significantly between industrialised countries. Pressures on the hospital sector such as ageing populations, technological advances, rising expectations and health inequalities are acknowledged. Government responses are discussed as are a

wide variety of forms of health service restructuring. Methods of health service rationing are observed as governments respond to the increasing cost of health care. Finally, the outcomes of health service restructuring and rationing are discussed before an overview and critique of literature is undertaken that will examine how geographers and others have approached these themes.

Chapter 3 provides an overview of the New Zealand Hospital Sector. It aims to examine how the hospital system has adapted to restructuring and how this has affected access to hospital services. The establishment of the hospital system will be considered. During this time the New Zealand Government pursued goals of equity and social security which framed their on-going approach towards health and welfare services. The pressures faced by the New Zealand Government are discussed and in the health sector they are very representative of what has been seen internationally. Government responses to these are examined, including various types of restructuring and an emphasis on rationing health services. As in Chapter 2 outcomes will then be discussed.

Chapter 4 introduces the New Zealand Booking System (NZBS). Firstly, the events which led up to the introduction of the booking system in 1998 are investigated. Processes involved in the booking system, prioritisation tools and waiting times are then explained in detail. The way the Ministry of Health reports on District Health Board's (DHBs) performance in providing elective services is critically evaluated. Finally, the author provides a review and some analysis of the NZNBS drawing from past studies and setting the scene for the objectives of the analyses in the following chapters.

The purpose of Chapter 5 is to introduce the data and methods used in the research. To begin with the objectives will be revisited and the structure of results chapters will be explained. This will be followed by an explanation of data collection methods, information on sources, variables within particular datasets, and techniques used to analyse the data. Statistical and Geographic Information Systems (GIS) methods will be discussed before details of qualitative interviews are made clear. Finally, a discussion of limitations give an insight into some of the problems encountered during this research.

Chapter 6 is the first of the results chapters. It focuses on the first objective which is to analyse the extent of geographical variation in public elective surgical waiting times. Waiting times for all elective operations are compared across New Zealand DHBs for the years 2004-2007 and compared with similar data from Australia. Waiting times are then broken

down by specialty and compared across New Zealand to see if there are significant differences between specialties.

Chapter 7 addresses the second objective of the thesis, which is to determine the extent to which public elective surgical waiting times vary between different sub groups of New Zealand's population. Initially, waiting times are broken down by individual factors such as age, gender, ethnicity and deprivation are examined. This is then followed by a more detailed analysis of the extent of variation in waiting times by ethnicity and deprivation for each DHB.

Chapter 8 focuses on the third objective which is to uncover contextual factors for differences in waiting times and specifically to see whether the success of the private hospital sector is having a detrimental effect on public surgical waiting lists. To begin waiting times will be calculated by urban-rural profile to determine if access to public elective services depends on the proximity to specialised urban hospital resources. At this point hospital admission rates will be calculated for the public and private sectors for a means of comparison between admission rates and the waiting times experienced within each DHB.

Chapter 9 will discuss the findings of the three results chapters in conjunction with interview feedback from key stakeholders in this research including a group of medical specialists and hospital administrators. Finally, the chapter discusses some theoretical implications, policy recommendations and suggestions for future research before summarising the main conclusions of the research.

1.7 Conclusion

The first chapter has introduced the aims of this thesis within the context of previous research and current issues concerning access to elective surgery. Waiting lists/times have always been a politically sensitive matter but since the introduction of the NZBS they have been of increasing public concern. Geographers have widely discussed inequalities of health outcomes and service provision, but few have looked at access to elective treatments. The next chapter will establish the context of the thesis in the wider international literature of hospital systems and provide an overview of the varying roles that Western governments take in the provision of health and welfare services.

2 Health and Welfare Systems of Western Societies

2.1 Introduction

The role of health care amongst other social welfare services in Western countries has been well documented within international literature (Altman et al., 2003, Besley et al., 1994, Freeman, 2000). After World War Two (WW2) welfare systems were developed as confidence remained in the belief that planning, scientific analysis and social engineering could deliver solutions to the majority of social democratic capitalist societies (Pinch, 1997). Since the 1970s state fiscal crises have challenged welfare systems and have since prompted significant changes in government approaches to solving public policy problems. Advanced industrialised countries have prompted repeated changes in the provision of welfare services. The success of restructuring within the health care sector remains uncertain although many have written about the accomplishments and failures that changes of this nature bring (Mohan, 1989, Barnett, 2000b, Boston et al., 1999).

The aim of this chapter is to provide an overview of the way geography and other social sciences have examined the role of governments in providing access to health services. The chapter will begin by looking at the evolution of the hospital sector throughout western nations and the adoption of particular goals used in the production of health. Hospital services will then be situated within a broader 'welfarist' approaches which typified Keynesian principles of centralisation and redistribution that originated in the 1930s. The second section will introduce the pressures felt by hospital providers and governments in the context of rising public expenditures and growing inequality in access to services. Thirdly, the chapter will introduce techniques such as restructuring and various types of rationing which have been used by most governments in order to alleviate pressure on the hospital sector. A review and critique of geography's contribution to studies of health services will conclude the chapter.

2.2 The Role of Hospitals in Western Countries

Hospitals are important for the provision of health care amongst other social and welfare services. The way health care is administered varies widely from country to country according to an array of political, social, cultural and economic factors. Geography provides useful conceptual perspectives for unravelling problems within health systems and by providing a 'holistic' approach. Analysis can further understanding outside what traditional health sciences and other related disciplines may offer. According to Barnett and Barnett (2009), the discipline of geography has a useful 'whole systems' approach which is valuable when analysing health systems. There has been a long history of geographical analysis in health service delivery, especially with the continual changes that have occurred within modern health systems (Barnett and Copeland, 2009). This section will identify the changes that have occurred in the delivery of health care services, situate health amongst other welfare services and illustrate variation in the goals of health care provision which has driven government policy agendas.

2.2.1 The Evolution of Hospital Systems

During the 19th century hospitals in Western economies operated under assistance from the state, charitable or religious trusts and were developed under pressures of urbanisation, industrialisation, and emerging health concerns. Hospitals at this time were set up largely to serve the poor; affluent communities chose to use small community private practices of one or more doctors much like the way we make use of primary care today. The focus during this period was around public health and preventative medicine to reduce the spread of infectious disease. At the turn of the 20th century a social transformation began in which hospitals moved to the centre of health systems. As populations grew, the middle class begun to demand more comprehensive care and in many countries for-profit investor owned hospitals emerged which led to the commodification of medical care (Mohan, 2002). From this point on the role of science and technology in medicine flourished as hospitals were legitimised in shifting costs to consumers as a key revenue flow. In the 1930s social justice concerns and the rise of organised labour meant further pressure was put on the state to provide universal hospital care (Bohland and Knox, 1989).

It was not until WW2 that developed countries begun to develop 'national' health systems which rose out of the Keynesian welfare state. Examples of this have been the

establishment of the Social Security Act (1938) which guaranteed unlimited access to hospital care in New Zealand, the development of the *United Kingdom* (UK) *National Health Service* (NHS) in 1948 and the formation of Medicare and Medicaid which guaranteed health care to limited populations of the elderly and poor in the *United States of America* (US) in 1965. More recently, Canada has enacted the Canada Health Act (1974) and Australia has established its version of Medicare in 1974, each of which guarantee universal coverage of a wide variety of hospital services to their citizens (Barnett and Barnett, 2009).

As a result of increases in the demand for hospital care over the past century it is not surprising that hospital care commands the largest share of health expenditure amongst developed countries. In Canada, hospital care accounted for 35% of health expenditure in 1995, a total of $26.5 billion (Heathcare Quarterly, 1997). In Australia similarly, 35.3% or $29 billion was spent in 2004 and spending on hospital services continue to grow as a percentage of health expenditure (Australian Federal Government, 2009). In New Zealand 49.6% or $2.1 billion was spent in 2000 on hospital and surgical services (Ministry of Health, 2002). Although large amounts of health expenditure in the latter half of the 20th Century have been placed within hospital services, more recently governments in many countries have begun to put a renewed emphasis on primary health care (PHC) led systems (Barnett and Copeland, 2009).

The emergence of aims to strengthen PHC systems were signalled by the signing of the Alma Ata Declaration (1978) and PHC-led initiates have taken precedence since the 1990s in Western countries incorporating a greater role for prevention and treatment. *General practitioners* (GPs) have become increasingly important for the financial management and prioritisation of patients based on their knowledge of community and population health needs (Barnett and Copeland, 2009). The emergence of PHC systems represented a shift back towards population health and prevention in a move to improve health status (Macinko et al., 2007), to reduce pressure on hospital services (Starfield et al., 2005) and reduce the impact of income inequality (Shi and Starfield, 2000, Hefford et al., 2005).

Changes in the physical and social environment, a decrease in the prevalence of disease and increases in life expectancy of those living in Western countries have led to increasing pressures on health systems. This has meant continual change in the organisational structures of health systems to meet the needs of society. The organisation of health services, the challenges they face and the reason systems have changed have been an

important focus of health services geography (Barnett and Barnett, 2009). In order to understand these issues we need to recognize the goals of health systems and to be able to frame these within the context of various social and political environments.

2.2.2 Goals of Health Systems

In an ideal world, optimal health policy would guarantee high quality health services universally across society on an equal basis. Since WW2 one of the principal goals of health policy in industrialised nations has been to seek to ensure equity of access to, and the quality of, hospital care. Most OECD countries interpret this principle as meaning that health care should be provided on the basis of need rather than the ability to pay (Van Doorslaer et al., 2006). The variation between national concerns can be explained the effectiveness of their health system. These goals of health systems are distinguished and shaped by national institutional, political structures, social and cultural norms (Blank and Burau, 2007).

Barnett and Barnett (2009) argue there are two broad goals of health systems. The first is to raise the health status of the community. This can be achieved by preventative means in the form of population health measures or through curative treatments. In addition, support from other welfare services such as housing or education, which lie outside the health sector, is valuable to raising the health status of the population. The second is to ensure appropriate access to high quality services across the community. Public, private and non-profit agents provide such services through a number of different mechanisms. The overall aim is to provide care on the basis of equal need and therefore to minimise inequalities in access to care on the basis of cost and distance to guarantee high quality services to all.

Three goals of health care are summarised in Figure 3. This illustrates how the three principles of efficiency, equity and effectiveness are inter-related in the choice of national health systems adopted by governments. The move to, or from, each circle represents a trade-off between the three values. Attempts to achieve these three goals have occurred mainly through governments' repeated attempts at restructuring health systems.

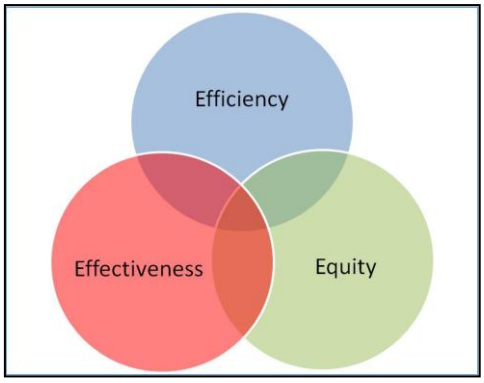


Figure 3: Goals of Health Care: Efficiency, Equity and Effectiveness (Blank and Burau, 2007)

Since the 1960s three distinct models of health systems in Western countries have evolved. These comprise redistributive, market and managerial models as illustrated in Figure 4. These have also been described as forms of restructuring (Barnett and Copeland, 2009). The redistributive model, typical of the UK's NHS or New Zealand's national health system, arose from welfarism and Marxist principles and promotes equity through the provision of universal access to a wide variety of health services (Pinch, 1997). The focus is on directing resources to areas of population need. The redistributive framework represents deliberate efforts on behalf of governments to alter the distribution of property, wealth or income held among groups of society though progressive taxes or other mechanisms (Blank and Burau, 2007). By adopting this sort of framework providers are forced to explicitly ration innovative and expensive treatments limiting the effectiveness of some services (Spicker, 2008). Efficiency remains important in such systems though tight public management of health finances.

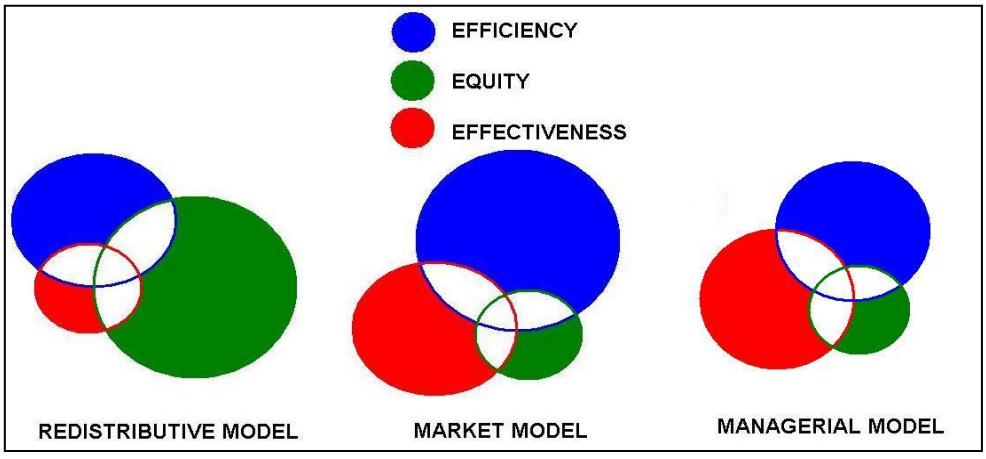


Figure 4: Goals of Restructuring in each Model of Health Care Provision

The market model (illustrated in Figure 4) arose out of public choice theory (Self, 2000), neo-liberalism (Pinch, 1997) and are exemplified by goals of efficiency for the financing and performance of health services. Market principles encourage some level of innovation in health care therefore increasing the effectiveness of medicine but may threaten equity by restricting public access through individual ability to pay for treatment (Bohland and Knox, 1989). This may remind us of the US, market-based, highly technological model where, traditionally, only limited public provision has been guaranteed to the very poor and to elderly citizens with the remainder of the population left to provide for themselves through private insurance or individual payment (Scarpaci, 1989). Only since the recent Obama health reforms of March 2010 has the US pledged to increase health insurance coverage for a larger percentage of the population (Tumulty et al., 2010).

Managerial models of health systems and restructuring (illustrated in Figure 4) aim to maximise efficiency and effectiveness but, as a result, tend to forfeit principles of equity. Restructuring towards this type of system emerged out of a form of 'New Public Management' (Hood, 1991) which aimed to improve accountability by integrating services (Barnett and Copeland, 2009). Many countries have adopted principles of managerialism in their striving for efficiency including New Zealand, the UK, the Netherlands and Japan. Issues of equity, inequality and exclusion have been theorised by geographers in relation to changing health policy in the wake of market and managerial restructuring (Kearns and Moon, 2002). These include discussions of equity and equality which can be applied to all health systems and in the wider context of welfare services.

2.2.3 The Welfare State

Much investigation into the provision of health services delivered through national health systems of developed countries has been sought in the context of the Keynesian welfare state. Studies of the welfare state have involved much comparative analysis at a national and international level. Authors have constructed 'typologies' in which they group countries according socio-political context. Examples of these frameworks include:

- Castles' (1999) concept of 'families of nations' which clusters nations according to their history and geographic features.
- Esping-Anderson's (1990) welfare state regimes which identifies distinct welfare state logics, including liberal, conservative/corporate, and social democratic ideologies.

- Therborn's (1987) division between market-orientated, full employment, interventionist and compensatory welfare states.
- Titmus' (1974) three models of residual, industrial achievement-performance and institutional redistributive welfare states.

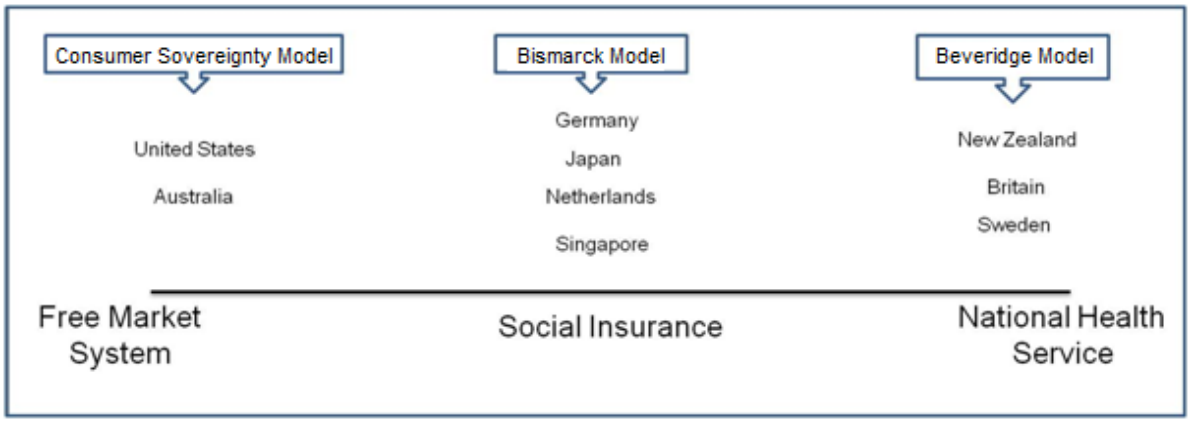


Figure 5: Types of Health Care System by Provision and Funding (Wall and Owen, 2002b)

Figure 5 illustrates one way in which welfare states can be characterised into 'typologies': the Consumer Sovereignty Model, where a free market system is predominant: the Bismarck Model in which social insurance schemes are prevalent: and thirdly, the Beveridge Model, where nations which operate a collectively funded national health system. Each system uses different institutional mechanisms in order to deliver 'welfare' or social services such as health or education to society. Each nation represents a unique mixture of finance, provision and governance pertaining to essential public services depending on the cultural values, demographic, historical and political structures as well as significant spatial variation across geographical and political boundaries within each country (Blank and Burau, 2007). Glennerster (1979) argues that public spending on any social service depends on five main factors: government ideology, cost of demands, taxation structure, the government's balance of power and economic drivers.

In countries with more individualistic 'consumer sovereignty' models, governments remain largely removed from the health system leaving the market to control the allocation of resources. This libertarian approach is typical of the US health care market where only the very poor and elderly citizens are publicly covered through government provided social insurance schemes (Medicaid and Medicare). Government offers employers tax incentives to offer private insurance but they are not required by law to do so, and many do not. Health

care is most commonly sought through costly health insurance schemes which many cannot afford. Outside of Medicaid and Medicare, the portion of the US population under the age of 65 who are uninsured has increased from 17% to 20% from 2000 to 2007 (Ayanian, 2009). Australia is also increasingly becoming more libertarian but the country still retains a comprehensive public health system (Vaithianathan, 2004). The effective control of free market health systems is least in these countries which rely on private insurance in that there is a predominance of private funding, and further fragmentation of third party insurers and many provider agencies.

In models of social insurance as illustrated in 'Bismarckian' economies all health funding is paid for through independent institutions which raise finance through worker and employer contribution schemes. While governments which adopt such approaches are not administered through public systems, they are regulated and mandated through public means (Freeman, 2000). Countries typically using such approaches are Germany, Japan, Netherlands and Singapore. In social insurance systems, control is weak in that finance raised towards health care is clearly visible as a percentage of peoples salaries, also the health care industry is fragmented into many private third party institutions who take some convincing to induce change (Moran, 1999).

Public or collectively funded health care where universal access is pursued is typical of a national health system operating under the 'Beveridge Model'. As we have seen above the UK, New Zealand, and Swedish health systems are all typical of this approach. Freeman (2000) recognises how it is common for national health services to be funded through one central agency. For example, in the UK and Sweden over 90% of funding comes from public sources flowing mostly from central government. Britain's health care service, the NHS, has been depicted as a 'command and control' system representing a strong collective finance and redistributive model (Moran, 1999). Differing approaches taken by governments represent some distinction in the way that health care policies are adopted.

2.2.4 Health Care Policy

Lowi (1966) characterises public policy into three basic ways that governments can intervene in different sectors to achieve relevant objectives for society. Regulatory, distributive and redistributive methods can be applied to the health sector in order to create favourable outcomes. Regulation is used to provide rules, restricting or imposing constraints on certain activities which is supported by law and appropriate sanctions. Distribution is

applied in the provision of goods or services to society. The redistributive role of government is also important in altering the distribution of income, wealth and property within society. This third function of government, the reallocation of resources which is present in all democracies is fundamental to the operation of the 'Welfare State' through progressive tax and other means of redistribution. The redistributive role is based on needs and entitlement, under objectives of equality it is the government's role to shift resources from healthy to non-healthy individuals. Issues of health care resulting from governments allocation decisions are commonly highly contested and always controversial as decisions always entail conflict (Blank and Burau, 2007).

Comparative Studies

Shared policy challenges arising from the economic and welfare state crises of the 1970s and 80s has led to a number of comparative studies of nations health care policies. Globalisation, travel and information technology were a factor in making it more relevant and necessary to interpret these international differences (Bennett, 1991). Ovretveit (1998) argues that in order to solve problems comparative health research has a role in creating knowledge that helps people to understand their differences and similarities and that health managers can improve services by sensitively adapting ideas that have worked elsewhere. Comparative studies are useful in order to study different systems under various institutional and value contexts to uncover which policies work and those that do not work. Deleon and Resnick-Terry (1999) describe this body of work as the 'comparative renaissance'.

Geographers have analysed local geographies of health services by acknowledging contextual factors and trying to explain changes in health services policy (Jones and Moon, 1992). Comparative studies have indicated that there are global trends in the development of health policies and that national health services of the industrialised world are becoming ever more alike (Harrison et al., 2002, Wessen, 1999, Mohan, 1998). Given the common problems faced by a variety of different countries, it is not surprising that policies have tended to converge.

Many studies document how these strategies are being shaped and follow common global trends in the formation of health policy (Harrison et al., 2002, Wessen, 1999). Chernichovsky's (1995) research suggests that health care reforms, regardless of the differences in health care systems, which have taken place have led to the creation of a common paradigm of health care financing, management and organisation of resources

which differentiates across both conceptual (market vs. centrally planned) frameworks and ideological (public vs. private) lines. However, Mohan (1998) argues that social scientists too easily accept the notion of convergence and so fall into what Taylor (1989) refers to as 'the error of developmentalism' of which criticises authors for creating arbitrary 'typologies' to characterise states by superficial similarities. Mohan (1998 p116) suggests that … *"an appropriate framework for analysing change in the welfare state must start from the underlying characteristics of the societies it is analysing rather that from the characteristics of the health care systems within them."*

2.3 Pressures on the Hospital Sector

Up until WW2, health care was limited to providing 'public health' solutions as curative capabilities were limited and for the most part ineffective. It was not until the 1950s and 1960s that the focus shifted from public health to curative care. In an effort to provide health and other welfare services to society governments around the world have faced increasing expenditure relative to national incomes. As Fuchs (2005) notes, efforts to control and monitor health expenditure are relevant because spending used in health can otherwise be used to provide value to other public services such as housing, education and environmental protection.

A variety of pressures have led governments to place limits on health services and all have faced controversy over struggles of allocation although some systems have fallen under less scrutiny than others. The first section will look at some of the pressures of efficiency and effectiveness faced by the health sector including the continual ageing of world populations, the proliferation of costly new technology/treatments in medicine and the limited supply of skilled physicians combined with increasing public expectations and demands.

Along with these pressures concerning the efficiency and the rising cost of hospital care there has also been concern over the equity of access to hospital care and tendencies for some populations to experience especially high admission rates. The second part of this section will examine some of the inequalities that geographers and commentators from other disciplines have found in a variety of different contexts. Because of the huge emphasis of rights in health care, great scrutiny is placed on national health systems of developed countries to achieve equitable and equal outcomes across society. Issues of exclusion and inequality are of public interest and therefore are important to consider amongst other

pressures placed on the hospital sector. Inequalities generate pressures on health systems as they threaten the equity objectives of the welfare state and the political autonomy of governments in developed nations.

2.3.1 Pressures of Efficiency and Effectiveness for the Provision of Hospital Care

Ageing Populations

It is no surprise that the elderly demand a disproportionate amount of health resources and it is for that reason that ageing of populations globally face increasing health expenditure. In 2003 for the US, social insurance for the elderly represented over 45% of annual health related *Gross National Product* (GNP) (Bitton and Kahn, 2003). This, combined with the fact that once these people reach retirement status they no longer contribute wages through the tax system, means there is less national income to fund government expenditure. Demographic ageing is prevalent because of the decline in fertility since the 1970s, the baby boom post-WW2 and the increase in life expectancy due to better lifestyles, health habits and increases in health technology (Spicker, 2008).

Technological Change

Increases in heath technology have been hugely influential for enhancing health provision in diagnosis, prevention and intervention. However, innovative treatments tend to cost significantly more than older forms of treatment. Over the past century morbidity trends have indicated a gradual decline in so called ‘traditional’ diseases (e.g., tuberculosis, poliomyelitis, and diphtheria) while there has been an increase in the demand for more comprehensive treatments e.g., for organ failures, injuries and cancers (Gauld, 2009). According to Zwillich (2001) one of the most important factors in the escalation of health care costs has been the proliferation of new pharmaceuticals and medical technology. The consensus among academics is that the biomedical revolution persistently drives up health care expenditure (Aron and Patz, 2001).

Priority setting has come to the attention of policy makers as we have seen the rapid expansion of ‘last chance’ treatments. These are those that signify the last chance for prolonging the life of the medically needy. There has been a tendency to pursue treatments up to the point where marginal benefits outweigh the cost of treatment (Altman et al., 2003). As a result there has been an over-reliance on and utilisation of high-tech interventions

(Ubel, 2001). Unintended consequences may result as demand increases for these services. The threshold in prioritisation of patients seeking treatment of a less serious nature may be threatened. This may occur when the demand for technological intervention increases and costs flood out those lower priority cases. Fuchs (2005) emphasises the need for physicians and hospitals to work within capped budgets and, where possible, to limit the introduction of new technologies. However, this remains difficult as individual patients have become more informed though the media and the internet and are becoming less tolerant to inconsistencies in the health care system (Scott et al., 2005).

Rising Expectations

Health professionals are trained under the guiding principles of the do-everything, 'maximalist approach'. Restriction in the provision of new medical technologies risks condemnation from practitioners, patients and the public (Fuller, 1994). Users of public health care services are increasingly less willing to accept the 'gatekeeper' role of GPs, particularly when inconsistencies in access and perceived failures of the public health system are regularly publicized throughout the media. As a result politicians find it increasingly difficult to limit patient access to new technologies (Blank and Burau, 2007). In 2003 Ministers of Health from Chile, Germany, New Zealand, Greece, Slovenia, Sweden and the UK met in Stockholm for the International Forum on Common Access to Health Care Services at which they reasserted that a common trend of rising public expectations was an important pressure to acknowledge in health systems as well as other pressures of ageing populations and the rising cost of innovation (Oliver and Mossialos, 2004). Managed care organisations (discussed below) have sought to engage governments, corporate providers and doctors to attempt to change public expectations in the national interest (Hart, 1998).

Quality

The pressures mentioned above mean that modern medicine in the developed world has created an unsustainable demand for doctors. In response, under influence from pressures of 'globalization' more-developed countries have begun recruiting graduates from other countries to meet their health care needs (Bundred and Levitt, 2000). This phenomenon has been referred to as a 'medical carousel' (Ncayiyana, 1999) or 'the brain drain' (Raghuram and Kofman, 2002) of which doctors seem to be repeatedly emigrating to countries with a higher standard of living. For example, Indian doctors move to New Zealand, New Zealand doctors move to Australia, Australian doctors move to the UK, UK doctors move to Canada

and Canadian doctors move to the US. In developed countries foreign doctors tend to gain employment in less desirable locations. In the UK foreign doctors tend to work in areas that British doctors would not live and perform jobs below their professional qualifications (Williams, 1998), and in US inner-city hospitals foreign doctors provide services to America's poor (Mullan, 1997). This draining effect on countries' skilled labour resources has put the quality of health services at risk and has meant increasingly services have had to be withdrawn in certain areas.

Avoidable Hospital Admissions

The concept of 'avoidable hospital admissions' acknowledges that some hospital admissions may be successfully prevented if patients were to seek timely and effective treatment (Nolte and McKee, 2000). Timely, quality primary health care is essential in prevention of these admissions. There are many conditions that if picked up with early diagnosis can be prevented from becoming an acute illness or at least prevent deterioration which may involve visits to hospital (Sheerin et al., 2006). By achieving this, patients benefit and hospitals are relieved of pressure to free up hospital beds for those who need emergency care and cut hospital waiting lists (Saxena et al., 2006). In New Zealand evidence has suggested that there have been increases in avoidable hospital admissions since the 1980s (Barnett and Malcolm, 2010). Of particular significance some studies have suggested that a relationship exists between avoidable hospital admissions and the underutilisation of primary care especially by lower socio-economic groups, and ethnic minorities (Dharmalingham et al., 2004, Billings et al., 1996, Gaskin and Hoffman, 2000). In the US research has shown that potentially avoidable hospitalisation can be negatively correlated with income and insurance ownership (Weissman et al., 1992, Djojonegoro et al., 2000). Alternatively, in Canada where coverage for all physician fees and hospital expenses are freely available across the population this relationship is not found (Billings et al., 1996). In the realisation that early intervention can reduce pressure on the hospital sector, governments in Britain and New Zealand have reorganised health services to shift responsibilities from secondary to primary care (Department of Health, 2000, Sheerin et al., 2006)

Supply-induced Demand

Many have observed that regardless of the extent to which health care services have expanded, there has been a sustained pool of unmet demand throughout the population (Cundiff and McCarthy, 1994). Supply-induced demand is more common in countries with

fee-for-service (FFS) systems where doctors are more autonomous in clinical-decision making. This presents a risk when much of the private health sector relies on third party payments and there may be little disincentive to prevent the over utilisation of medical technology. Demand is generated for technology, prices rise, spending increases, and public expectations further increase. This is the situation that is common in the US which is dominated by the private health care industry where not surprisingly they spend the most per capita on health care than any other developed country, a staggering US $5,711 per-capita in 2003 (Borgor et al., 2006). The next biggest spenders were France (US $3,048 per-capita) and Britain (US $2,347 per-capita), two nations which had social insurance and national health services as their significant health providers (OECD, 2006). Supply-induced demand comes with some exceptions in the US in the case of managed care organisations which try to inhibit the demand and use of highly technological and expensive services.

Managed Care

Managed Care is a tool used primarily in the US for the improvement in the performance of health systems. Prompted by Federal legislation in 1973, similar developments have also been evident in the formation of *primary care organisations* (PCOs) in the UK and New Zealand. PCOs evolved as a response to, and as a consequence of recent government policy. In the US, health maintenance organisations (HMOs) have been the focus of managed care, particularly since the 1980s, in response to rises in the cost of health care associated with common FFS indemnity insurance. They were initially non-profit but they have been increasingly corporately owned (Barnett and Copeland, 2009). HMOs offer a range of management techniques and financial incentives which are aimed to control cost inflation, assure quality and dismiss the over utilisation of services associated with the former FFS insurance (Ham, 1998). These institutions were designed to dismiss unnecessary or unproven services in favour of the appropriate treatment and to focus spending on low-cost early intervention with the hope that they prevented high-cost interventions at later stages (Shapiro et al., 1993).

HMOs exhibit control over providers, especially in for-profit HMOs by rationing access to both primary and secondary services by way of explicit clinical guidelines (Kletke et al., 1996). Through the growth of HMOs throughout the 1990s the US has been successful in slowing health expenditure. However, there is evidence that this has not been sustained (Simonet, 2005). Explanations behind this have included: poor quality services generating a

consumer backlash; spiralling hospital and physician costs; and extensions to plans to cater for more vulnerable Medicare and Medicaid patients (Blendon et al., 1998). The health outcomes experienced by members of HMOs has been shown to vary by patterns of ownership, with non-profit out performing for-profit organisations (Himmelstein et al., 1999). Since the negative publicity around managed care institutions in the early 1990s, consumer satisfaction seems to be leaning towards FFS plans and this has been shown in an increased market share for these plans, in favour of choice, regardless of facing inflated fees (Draper et al., 2002).

Roemer's Law

In 1959, Milton Roemer drew attention to the feature he believed determines the utilisation of hospital resources regardless of context, that is the supply and availability of hospital beds. He believed that the capacity of health systems determines and leads to the manipulation of consumer demand independent of demographic and population factors (Roemer, 1959). Roemer's findings in his (1961) study reinforced his hypothesis that the use of hospital resources rises following increases in the bed supply, thus indicating that supply induces demand for the utilisation of hospital resources. This phenomenon is also known as 'Roemer's Law'. Roemer's law has been demonstrated in a series of national contexts including Australasian, North American, Scandinavian, British and other Western European countries (Ham, 1988, Anderson and Mooney, 1990). Research has generally been undertaken using macro data, most which identifies variation in service demand (measured by differing admission rates and length of stay) as being determined by variation in the supply of hospital beds and available medical staff (Wennberg and Gittlesohn, 1982, McPherson et al., 1981, Rothberg, 1982, Clarke, 1990, Richardson and Yusuf, 1982). In New Zealand, Barnett et al (1980) and Brown et al (1992) uncovered similar findings that public hospital admission rates reflect regional variations in bed supply rather than differences in need. Pressures for efficiency and effectiveness as mentioned throughout Section 2.3.1 often conflict with goals to increase equity for the provision of hospital services. The next section discusses pressures that are evident when considering the equitability of access to hospital services.

2.3.2 Pressures of Equality for Hospital Access

A wide range of literature has explored geographies of equality, inequality, and exclusion in aspects of health policy (Scarpaci, 1989, Barnett and Lauer, 2003, Howden-Chapman and

Tobias, 1999, Pearce et al., 2006, Van Doorslaer et al., 2006). Compared to the large body of literature that has compared inequalities in health service utilisation there has been few studies on the 'quality' of health services delivered among certain groups within communities. This becomes important when interpreting whether or not money is being spent effectively and so delivered to those who are in most need of health services. Evidence has shown that there are socio-economic and ethnic biases in service utilisation, ingraining forms of exclusion throughout health services (Barnett and Barnett, 2009). Exclusion imposes pressures on health systems because goals of equity and effectiveness are threatened as health services are not delivered to populations most in need. These issues of equality mean that concerns arise related to poor access to PHC and result in further avoidable hospital admissions. The theories of exclusion and inequality have been developed almost entirely from a 'welfarist' perspective and many studies represent this through their detailed discussion of health provision and neo-liberal changes to the welfare state (Barnett and Barnett, 1989, Fougere, 1974, Mohan, 1995b).

Past international studies into health systems have identified inequalities associated with the following factors:

- socio-economic status
- gender
- age
- ethnicity.

Commonly cited within the literature is the 'inverse care law' (Watt, 2002), which applies to each category of inequality. The inverse care law states that the availability of medical care tends to vary inversely with the need of the population served (Barnett and Barnett, 2009). Statistical discrimination (Balsa and McGuire, 2001) and stereotyping (van Ryn and Fu, 2003) have also been suggested as possible explanations for differences in access to care.

Social and economic variants have much influence on the health outcome of different groups among any particular nation. In several studies a lower social class as determined by income, education or socio-economic status (SES) levels have been undertaken internationally linking these with higher rates of morbidity and mortality (Fuchs, 2004, Fukuda et al., 2004, Marmot and Wilkinson, 1999, Manderbacka et al., 2009). Australian researchers found similar trends in that rates of chronic disease vary largely across the

socio-economic gradient and drew the conclusion that policies made at a population level should acknowledge such inequalities (Glover et al., 2004). Even in comprehensive collectively funded national health systems with universal coverage like the UK, health outcomes vary significantly between income groups. One particular study identified that the lowest income group was four times more likely to be admitted to hospital than the highest income group (Angell, 1993). Despite this, studies have shown that patients of a higher socio-economic background are more likely to receive comprehensive care from physicians. The hospital sector has observed similar trends in that patients of lower socio-economic status seem to have shorter lengths of stay and in some cases have been less likely to be referred for surgery than other patients with parallel needs (Barnett and Barnett, 2009).

Studies have also looked into the association of age and gender with inequalities in the prevalence of morbidity and in the access to health services. We know that women make greater use of health resources not only because gynaecological services are exclusively reserved for women but because of their longer life expectancy (Wall and Owen, 2002a). MacLoed, et al found a clear association between age and sex with admission rates in their (1999) study of coronary heart disease in Scotland. Likewise, Vallgarda (1999) notes that there has been a disproportionate increase in admission rates throughout the twentieth century for those in higher age brackets over younger admissions, with higher admission rates for old men than women. At the same time as demand seems to be growing for hospital services, Schrag, et al's (2001) research into rectal cancer intervention shows that treatment rates radically decline with increasing age of diagnosis. This evidence raises concerns for politicians and policymakers alike as ageing global populations demand an increasing share of health resources and age and gender related inequalities become increasingly visible throughout the population.

Smedley, Stith, & Nelson (2002) point out many racial and ethnic minorities are subject to poor health through individual risk factors, these are compounded by a greater prevalence of minorities in the lower socio-economic tiers. House & Williams (2000) acknowledge that the disparity that racial and ethnic minorities face are largely due to differences in social, socio-economic, and behavioural risk factors and through variance in environmental living conditions. Risk factors for certain groups have been shown to influence ethnic minorities in their extremely high rates of hospital admissions. Racial and ethnic minorities are disproportionately represented in a variety of serious illnesses such as cardiovascular disease (Schneider et al., 2001), various forms of diabetes (Chin et al., 1998) and renal

disease (Epstein et al., 2000). They also suffer disproportionate access to some diagnostic tests (McMahon et al., 1999), treatments (Imperato et al., 1996) and many surgical procedures (Smedley et al., 2002). The targeted provision of health care to these groups is necessary but has been inefficient in addressing racial and ethnic disparities in health status (Williams, 1999).

Health systems have been subject to an array of pressures that have placed limits on the delivery of health services. Discussed above are global pressures driven by demographic changes, the medical revolution, supply of skilled doctors and the rising expectations of providers, politicians and the public along with pressures of inequality and exclusion. All of these have implications on health system goals of equity, efficiency and effectiveness. The next section will discuss responses made by governments on behalf of health systems to provide better health outcomes delivered at a reasonable cost to taxpayers.

2.4 Responses by Governments

This section begins by approaching the conceptual understandings behind responses to pressures seen in the provision of hospital services. Regulation and agency theory are discussed in relation to dominant forms of hospital restructuring. The three goals of equity, efficiency and effectiveness will then be revisited in the discussion of three main forms of health services restructuring. Then a series of strategies adopted by different countries over the past three or so decades will be examined. The final part of this section will acknowledge governments' continual efforts to ration health services through competing goals of efficiency, equity and effectiveness.

2.4.1 How have 'Responses' been Conceptualised?

Writers have acknowleged the 'crisis' of the welfare state in which pressures, such as those acknowleged in the previous section, are placing unsustainable demands on Western welfare systems. The pressures have been producing conflict between rising demands and expectations and, alternatively, falling state resources (Pinch, 1997). Agency and regulation theories and other key frameworks for analysing structures in health systems have been used to understand changes in provision (Giddens, 1984, Wolch and Dearm, 1989, Pinch, 1997). 'Regulation theory' has been used to compare political, social and economic systems to understand and determine differences in a variation of health systems at a macro level

and study inter-country variation. Agency theory views the world as a series of relationships in the form of incentivised contracts. Agency theorists believe that a contract based system provides control in the implementation of policy and limits the possibility of opportunistic behaviour (Gauld, 2009). Agency theory is relevant when national health policy is being applied in local contexts and is largely a process that is developed with interaction between different levels of political agents.

Barnett and Copeland (2009) describe health care restructuring as a new form of regulation as defined by 'regulation theory' (Pinch, 1997) especially when key changes are initiated in the relationship between the state, providers, and patients. The theory is used not to uncover a single explanatory factor but to unravel a series of intertwined and complex relationships to explain inter-country differences. Regulationists believe that distinctions in regulation will be found among nations according to different institutional practices, cultural traditions and the social and political struggles. Health restructuring has been influenced by 'globalisation' and the diffusion of ideas from past reform. However, restructuring seems to take different forms in different places (Barnett and Copeland, 2009). The concept of 'fordism' as a mode of regulation is typical to that of the 'welfare state' however, some systems developed further than others. Following WW2, European and US welfare systems developed in starkly different ways. European systems evolved towards a social democratic form of welfare system, whereas the US adopted a free market/laissez-faire approach to the allocation of public services (Pinch, 1997).

Agency theory has the ability to link macro ideas down to the micro level such to integrate people with places and the local context with the global context (Kearns and Moon, 2002). Agency theory deals with political processes, concerning power relationships between managerial and provider behaviour as a result of decisions made at higher levels of governance. This has been useful in examining and identifying the ways in which macro health policies have affected the decision making process at the local or micro level. However, agency and regulation theory overlook some political and social processes that are so important to the hospital sector. For example, Agency theory fails to consider the huge influence the US political system has had in passing revolutionary health care reform. In early 2010 the US state of Massachusetts had the ability to provide the deciding vote in Senate to seal or spell the demise of controversial Obama health reforms (Clarke, 2010). Subsequently the bill passed giving the whole nation a better prospect of increased coverage of health care into the future. Regardless of examples like this, regulation and

agency have provided geographers with a valuable tool to help examine health services geography.

2.4.2 Forms of Health Service Restructuring

The goals of health systems (equity, efficiency and effectiveness) discussed earlier in this chapter are used to justify government responses in various forms of restructuring in hospital services. Health service restructuring aims to redistribute resources more equitably between geographic regions, lessen cost by service integration and improved provider accountability and by better managing expenditure on services (Barnett and Barnett, 2009). There are various forms of restructuring each that have occurred predominantly since the 1980s that have varied by country and social welfare setting. There are three basic forms of restructuring applied to health systems in order to make improvements in equity, efficiency and effectiveness and they are loosely based on the adoption of redistributive, managerial or market based systems. Table 1 provides a useful overlay of the three forms of restructuring against goals of equity, efficiency, effectiveness and favourable political outcomes. Within the table are different strategies which governments have adopted which have fallen under a type of health service restructuring or a goal. However, strategies are not exclusive to one box, some perform a number of functions although some may be limited.

Types of Restructuring KEY GOALS	*Redistributive*	*Managerial*	*Market*
Equity	Needs-based funding		
Efficiency		Corporatisation Intensification Flexibilisation Rationing	Internal Markets Privatisation
Effectiveness		Deinstitutionalisation Rationalisation	Technical innovation / improvements in quality
Other Goals: Eg. Political		Devolution	

Table 1: Forms of Restructuring

Needs-based funding

The theoretical underpinnings of welfarism and Marxism in terms of redistributive restructuring place strong emphasis on equity and to some extent efficiency. Freeman (2000) notes that by centralising funding, enhanced public control is achieved. This is demonstrated by strong public control of national health services in countries where redistributive systems operate. Governments operating such systems will also adapt their approaches around cost efficiency, containment and allocation of funds towards likely priorities in order to satisfy public interests (Fattore, 1999). With the pressures mentioned in earlier sections of this chapter processes need to represent policies aimed at meeting the growing demands for health care within a fixed budget.

New Public Management

New public management (NPM) is a style of restructuring that became a dominant international trend in public administration during the 1980s and 90s. NPM is part of the managerial revolution that applied new strategies to achieve goals of efficiency, service integration and accountability. The rise of NPM established in the UK, soon spreading to the US, Australia, New Zealand and finally to the Scandinavian countries and continental Europe (Lane, 2000). The NPM movement was born out of the 'new right' movement (Hood and Peters, 2004) and has been associated with some 'mega trends' in administration theory (Hood, 1991). These are: (1) to decrease government expenditure growth by reducing levels of spending and downsizing staff (Dunsire and Hood, 1989); (2) shifts away from core government institutions in favour of privatisation and quasi-privatisation (Dunleavy, 1989); and (3) the introduction of an international agenda focusing on policy design, decision styles, international cooperation and general issues of public management (Hood, 1990).

Hood (1991) characterises the ways in which NPM came to embody public service management. Aspirations of accountability have led government departments to clearly defined targets, allowing for responsibility for action, and performance-led resource allocation. Goals of efficiency have meant a greater reliance on competition in the form of public tendering and private management techniques in the public sector. Political pressures have also created pressures to disaggregate public administration to smaller units of governance as it was believed that this would make it more manageable to encourage competition between providers (Hood, 1991).

Devolution

Devolution is an important strategy which falls within NPM. Many have commented on changes in the structure of welfare states as many countries shift to devolve government to smaller administrative units as part of a 'new wave' of management theory (Flynn, 1995, Pinch, 1997). It has commonly been referred to as the 'hollowed out' state (Jessop, 1994a, Jessop, 1994b, Rhodes, 1994, Barnett, 2000b, Barnett, 1999). Importantly, 'hollowing out' means the shift of responsibility in which central governments can distance themselves from making contested decisions which result in unpopular inadequacies in local health services (Mohan, 1995b). The extent to which this has occurred has resulted in variations the way different states have adapted to the process of reform (Pinch, 1997). Barnett (2000b) notes that the 'hollowed out' state represents not only a process of devolution but also a process of privatisation as it enables a wide range of non-elected community, non-profit and private providers to compete for contracts.

Internal Markets

The internal market also is a mixture of managerial and market based restructuring. This encourages governments to seek a balance between neo-liberal and centralist ideologies such that cooperation is favoured over competition so that more balanced goals of equity and efficiency can be realised (Barnett and Barnett, 2009). The health systems of Sweden, UK and New Zealand are distinguished by fiscal, administrative, political decentralisation such that all countries have a high degree of public integration and control within their health systems (Saltman and Bankauskaite, 2006). All three health systems introduced a purchaser/provider split during the late 1980s and early 1990s in order to try and mimic market conditions in order to stimulate competition amongst providers (Walsh, 1995, Blank and Burau, 2007).

Under the public contracting that came in with the introduction of the internal market a market-style dynamic was introduced into the NHS (Harrison, 2004). This internal or 'quasi' market has brought about a system of managed competition with strong aspects of planning and regulation to provide incentives in order to improve efficiency (Le Grand and Bartlett, 1993, Renade, 1997). In Germany and the Netherlands focus was placed on the purchasers rather than the providers so that individuals were free to change insurance firms in a drive to increase competition between insurers (Greb et al., 2004, Lieverdink and van der Made, 1997). This introduction of a 'third way' or a 'pick and mix' policy approach meant

governments begun to encourage collaboration but more recent times have brought about further emphasis on competition internally within public systems in order to extend to a wider range of services (Crinson, 2005, Greener, 2004, Powell, 1999).

Privatisation of Hospital Services

Privatisation or free market restructuring was born out of neoliberalism, public choice and ultimately the need for efficiency in the face of global economic pressures triggered by a global spike in the price of oil, growing unemployment and the record inflation of the 1970s. The 'new right' movement led to the emergence of political parties which promoted the introduction of the market as a more efficient way of distributing health services. These parties campaigned for the deregulation of private markets with the view to breaking state monopolies in the provision of welfare services. Many countries of the OECD have sought to introduce market mechanisms into largely publicly funded and provided health systems (Fougere, 2001). As part of the neo-liberal movement countries begun to reconsider their public-private mix as a result of tension between equity and affordability (Van Doorslaer et al., 2006).

The inadequate resourcing of public systems to distribute health care according to people's demands and expectations forced those who could afford it to adopt a 'new citizenship theory' in which responsibility is placed on the individual over collective rights or universal benefits (Pinch, 1997). Mohan (1995a) suggests that the most significant factor has been the uptake of private health insurance throughout society which shows the inadequacy of public health resources in serving the infinite scope of demand throughout the population. The pursuit of customer choice and aims to relieve pressure on publicly funded health systems also led many conservative governments in Western countries to put increased emphasis on expansion of private health systems (Vaithianathan, 2002).

The ideology of centralised control over all health resources was challenged in the early 1980s in that publicly provided care was deemed inefficient, wasteful and unproductive. There was the belief that the market should allow prices to determine the tastes and preferences of the consumer (Scarpaci, 1989). Eyles (1989) cites privatisation as a social policy in reply to the challenge of cost containment. This leads to the debate as to whether or not the private health sector is more efficient than its public counterpart. Much evidence points to inefficiencies found in the provision of private health care as discussed in earlier

sections on supply induced demand which explains why the free market fails to allocate health care resources efficiently.

While the private market fails to deliver via some means, there has been some success in privatising and outsourcing the ancillary services which public hospitals require in order to operate, such as catering, cleaning, laundry facilities, IT services and even in some medical imaging specialties. The contracting out of such services has become common in a variety of different countries including the US, Australia, Japan, New Zealand and the UK (Pinch, 1997). Evidence suggests 20-30% of cost can be saved through the use of the private sector for these purposes (Walsh, 1995). Freeman (2000, 1999) notes competition assures more and better services for the every dollar spent in the health sector.

Regardless of which is more efficient, public or private provision, health care has increasingly been conceptualised and reconstructed as a commodity and as a product (Ham, 1997, OECD, 1994, Raffel, 1997). This transformation led to the increased emergence of for-profit service delivery in the hospital sector (Brown and Barnett, 2004). Such development has been most noticeable in the US where the insurance market dominates. Bohland & Knox (1989) nickname the US health care system as the 'medical-industrial complex' characteristic of the large medical corporations that dominate over the health marketplace.

Innovation

Market principles encourage some level of innovation in health care therefore increasing effectiveness of services. However, given the limited nature of funds that governments can designate for health care expenditure decisions have to be made on the nature and range of the health care services to provide (Gatrell, 2002). Most Western nations have chosen to guarantee universal coverage but limit the range of health services. Alternately, the US has opted for a market based system of high technological innovation and a comprehensive range of procedures for their population. As mentioned above some health systems have implemented market based restructuring to improve innovation and make improvements to quality of health services and to improve consumer choice.

Deinstitutionalisation

Deinstitutionalisation is the process applied to the transformation of mental health care services in a variety of international contexts with the key goal of raising the effectiveness of

service institutions. Deinstitutionalisation is a form of restructuring of which focuses on reducing the population size of mental hospitals (Joseph and Kearns, 1996). Since the 1960s large-scale, often 'monolithic' institutions have been disestablished in favour of community-based facilities. During this process many patients were released into the community which created problems of dependency, homelessness, helplessness and anti-social behaviours (Wolpert and Wolpert, 1976). Subsequent research has been done to detail the ramifications of deinstitutionalisation and difficulties for ex-psychiatric patients in reintegrating into the community (Kearns et al., 1987, Laws and Dear, 1988). These trends were reported particularly in the cities of North America where these findings were contextualised into concepts such as 'the public city' (Dear, 1980) 'the service dependent ghetto' (Wolch and Gabriel, 1985) and the reproduction of urban space (Dear and Wolch, 1987, 1989).

2.4.3 Rationing

The main purpose of any form of rationing is in pursuit of efficiency which has been increasingly important for hospital systems in recent times. Rationing can be conceptualised as a form of managerial restructuring. However, rationing has always been part of medical decision making. It is a reflection of scarce health resources the allocation of which is decided as a result of clinical decision making rather than trying to satisfy popular expectations (Wall and Owen, 2002b). Issues of cost containment and access lead governments to consider the rationing of health services often resulting in restrictions in access through financial and geographic barriers (Gatrell, 2002). No government can supply unrestricted access to health resources for all its citizens so all medical systems must utilise rationing as a tool to restrict financial cost (Ham and Robert, 2003). Fleck (2002) notes that rationing is an integral process to, and is often the reason for, health care reform. This discussion leads to further consideration of such systems.

The main point of rationing is to limit the services delivered to minimise spending and to enable governments to stay within their annual budgets (Spicker, 2008). This can be achieved by inhibiting demand but more common is the practice of governments to place limits on supply. Scrivens (1980) recognises two main ways that government can limit supply: restrictive or dilutant rationing. Restrictive rationing is used when people are restricted from using certain services. Alternately, dilutant rationing is led through some

reduction in the service, through limiting quality, accessibility or limiting period for which the treatment is given (Scrivens, 1980).

FORM	*CRITERIA USED*
**Physician discretion*	Medical benefit to patient Medical risk to patient Social class or mental capacity
**Competitive Marketplace*	Ability to pay
**Private Insurance*	Ability to pay for insurance Group membership Employment
**Social Insurance*	Entitlement / means test
**Legal*	Litigation to gain access to treatment
**Personal Fundraising*	Support of social organisations
**Implicit Rationing*	Queuing Limited manpower and facilities
**Explicit Rationing*	Triage
**Controlled Rationing*	Social benefit over specific patient benefits

Figure 6: Forms of Rationing (Blank, 1997)

Types of rationing are underpinned by each government's approach towards choices of health care provision, resource allocation, and priority setting (Blank and Burau, 2007). Figure 6 above shows a variety of ways that governments and health authorities can ration health services dependent on the type of political and social environment that they operate within.

Countries such as Britain or New Zealand which have had a far stronger control over the supply of health care, find it easier to use non-price or explicit forms of rationing. This is socially determined by the fact that government can justify spending less in one area on the grounds that the money is being spent on higher priority services. Whereas, countries based on the principle of free market economics find it more difficult to reallocate funds or deny any treatment to specific patients as there is no certainty whether the funds will be put to better use elsewhere (Blank and Burau, 2007).

There are a number of options that governments have used to ration health services in order to control public expenditure as illustrated in Figure 7. Frech & Lee (1987) suggest that those

with the most elastically demanded services should be the most severely rationed. Society's potential, and some would say unlimited demand can be restricted by five common methods of rationing: denial, filtering, user payments, delays, and some restriction in quality. This leaves the society's effective demand manipulated according to the government policies as seen above. Each of the five rationing tools mentioned by Spicker (2008) is briefly discussed below along using examples from New Zealand and overseas.

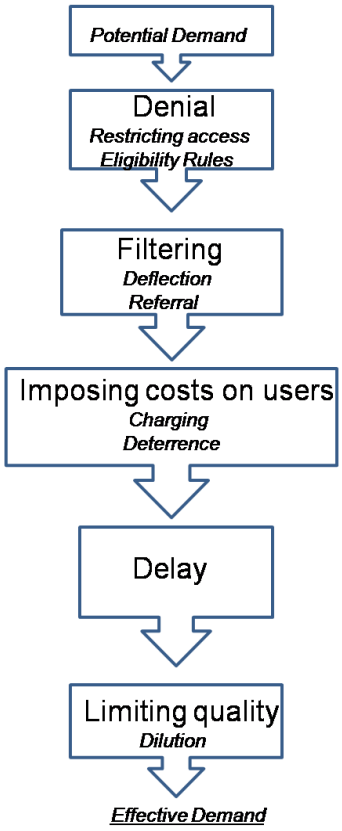


Figure 7: Rationing Processes (Spicker, 2008)

Rationing by Denial or Exclusion

Some systems use eligibility criteria to specify who gains treatment at certain points of entry into the health system. Eligibility criteria are important for rationing health systems. Health budgets cannot sustain treatment for all cases of morbidity due to the scarce nature of health resources but eligibility criteria mean that health systems can limit those treated to that of a certain level of illness (Spicker, 2008). Elster (1992) gives a range of examples of eligibility criteria have been used as criteria for acceptance or rejection, they include: age, race, religion, gender, family status and sexual status. These exclusions are imbedded in the

inequalities that were discussed earlier in this chapter. Age is one criterion which understandably forms a target for rationing in relation to the disproportionate use of health resources by the elderly. Some authors have suggested this to be the case but have also acknowledged that this is not possible in some countries because of the political power of the elderly (Callahan, 1987). This notion is most strongly resisted in the US but alternatively, the UK assesses age as a primary criteria for rationing health services at all levels of the NHS (Williams, 2000).

Rationing by Filtering

Filtering is an important means in which health systems can restrict health expenditure by authorising treatment only to those whom absolutely require it (Spicker, 2008). People who clinical needs are separated from others by way of referral and deflection mechanisms. Much research has scrutinised the role of GPs in acting as 'gatekeepers' for the referral on to specialists and secondary care (Farham, 2010, Toon, 1994, Gervas et al., 1994). The emergence of 'managerialism' has reinforced doctors as the managers and gatekeepers of medicine such that they hold a monopoly of control over medical knowledge, contents and conditions of work, regulation, recruitment and policing of the profession. Because of the authority held by the medical profession collectively through the operation of rules and procedures, doctors have gained control at the local level over the consumption of scarce medical resources (Pahl, 1977).

Rationing by Imposing Cost

One key way that government can inhibit demand is by way of the market in the charging for medical services. By raising the price of medical interventions, demand is reduced and if raised high enough will clear the market. Vary rarely are people made to wait for the provision of private goods; the fact is if you're willing to pay for the service required it will be available for you to purchase (Spicker, 2008). Rather than waiting, people tend to be excluded from treatments due to unwillingness or inability to pay for a service. For example, in the US where the free-market operates under a system of insurance, many choose not to pay the high premiums demanded by insurance firms. In 2007, 45 Million people were not covered by any form of health insurance (Blank and Burau, 2007).

Health providers can also restrict demand for a service by making it deliberately unpleasant to get, awkward to reach or humiliating to claim. Deterrence in this form is unusual but there

are several examples. Whether or not health providers meant it or not the stigma attached to claiming psychiatric care are significant (Spicker, 2008). In the 19th and first half of the 20th century authorities shamed and discouraged hospital patients from using care by parading them through the grounds of the workhouse so they would know just where they were (Smith, 1964). In current health systems there are no longer such crude methods of shaming patients but there are several systems which make it onerous to seek access to care, such as having to get a prescription for medicine or having to be referred before seeking advice from a specialist.

Rationing by Waiting

One of the most common forms of rationing, especially in national health services such as those illustrated in Britain or New Zealand is to delay the delivery of a service. Waiting lists are most appropriate when a particular resource is strictly limited and its availability unpredictable where the management and allocation of a resource creates the need to wait (Roake, 2003). Rationing by delay can be seen in its most simple form as waiting in a queue in which the first person that presents is the first served, and is usually seen as being fair. However, as people face differing health needs on the basis of urgency such simple systems need be disregarded in favour of priority systems, in which some people can be seen to be 'jumping the queue' (Spicker, 2008).

For decades surgeons have relied on systems of triage based on measures of urgency (urgent, semi-urgent and routine). Given the limited resources, the triage system contributed to long waits in some specialties (Roake, 2003). Also, prioritising schemes often lead to political pressures to add innovative new surgeries for specific individuals while at the same time those who would have been otherwise treated are excluded from treatment (Blank and Burau, 2007). Like queuing for concert tickets, or at the petrol pump, waiting for surgery represents a monetary loss of the value of your time spent waiting for a service. Rationing by waiting accordingly entails a welfare loss (Frech and Hopkins, 2004). Unlike other queues, this loss imposes a cost not only for time spent waiting in doctors surgeries but in lost productivity, income, quality of life (including physical and psychological pain and suffering) and increased reliance on family members as well as health and welfare services generally (Danzon, 1992).

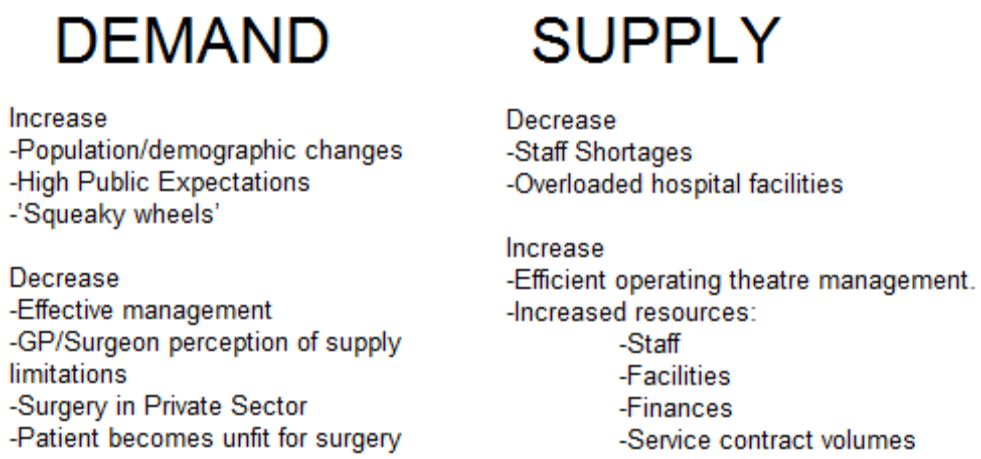


Figure 8: Factors Influencing Waiting Lists for Elective Surgery (Roake, 2003)

Waiting lists are widely reported to place great barriers on access to elective surgery, especially in two-tiered public/private health systems. The meaning of waiting lists was to prioritise access to surgery for all non-urgent conditions. There is a large amount of criticism over the lack of transparency that is sometimes shown for patients of greater need and a lack of certainty over access to surgery (Roake, 2003). It has been suggested that waiting lists have been generated simply because demand often outstrips supply for health services and, or in conjunction with, the inefficiency of health service providers (Gauld and Derrett, 2000). Waiting lists are dynamic. As Roake (2003) has indicated the size and rate of movement within a waiting list will depend on a number of factors as illustrated in Figure 8.

Rationing by Limiting Quality

Dilution of services is another way of inhibiting supply. Less common than other forms of rationing it is seen as a decrease in the quality, duration, or amount of a service offered. This is primarily because these actions run counter to professional ethics and teachings to ensure maximal treatment for the patient. However, some services are difficult or not able to be diluted such as operations and other specialist treatments (Spicker, 2008). More successful in providing universal health care services and controlling costs are Britain, New Zealand and Japan because policies are adopted to limit the availability of high cost, high technology medicine (Blank and Burau, 2007).

Pressures generated on health systems from the latter half of the twentieth century onwards have generated a series of coordinated responses in the form of a series of major

restructurings. Processes of health restructuring are aimed at reaching common goals of equity, efficiency and effectiveness through the fulfilment of redistributive, managerial and market orientated reform. The next section of this chapter will examine the outcomes that have been generated as a result of the restructuring that has been discussed above.

2.5 Restructuring Outcomes

2.5.1 Hospital Closure and Rationalisation

Many have looked at the impending closure of rural and suburban hospitals as the health market has moved to centralise resources in and around urban centres. Urban migration of doctors has occurred towards towns and cities in search of technology, valuable training and the proliferation of lucrative proprietary care (Raghuram and Kofman, 2002, Bundred and Levitt, 2000). In many countries that experienced this form of urbanisation in health care there was a shift away from hospital services. In the UK especially, cost effective care spelt a movement toward more comprehensive ambulatory provision for peripheral areas (Saltman and Bankauskaite, 2006). Successive British governments have envisaged 'primary care led' health care in which GPs have become 'gatekeepers' and managers (Blank and Burau, 2007).

Much literature has been written about the relocation of hospital services from rural settings to urban centres. One study looks at the closure of 52 rural hospitals into primary health clinics or 'wellness centres' in Saskatchewan, Canada (James, 1999). Another looks at rural hospital closure in the US between 1980 and 1986 and the implications for rural communities compared to benefits of the overall health system (Mullner and Whiteids, 1988). In the UK, rural hospitals, sometimes known as 'cottage hospitals' have faced the same fate. Inequalities with access to specialised care are generated as a concentration of health care services relocate to core urban populations (Stukel et al., 2005). Hunt (2006) examines how community resistance to hospital closures in Cumbria was mounting to additional rural hospital closures as the communities became more isolated and were forced to travel increasing distances in order to gain access to secondary treatments.

Inequalities have been widely reported on patients' travel, relocation and cost of time wasted travelling to and from specialist treatment. The notion of 'distance decay' is commonly referred to when medical services and facilities are moved further away from patients with the result that patients use less of a service. People are substantially more likely to make a

trade-off between the cost and benefits of accessing treatment (Barnett and Barnett, 2009, Pinch, 1997). Therefore, the closure of hospitals in rural centres and the move towards providing service out of urban locations means rural populations are suffering reduced access to quality hospital services.

2.5.2 Health System and Health Outcomes

Health systems have come a long way during the past century to better meet the needs for care and in generating positive benefits for health. As seen above, all countries have to ration health services to ensure they maximise efficiency while ensuring equitable access to effective care is maintained. Goals of service provision have been formulated by governments and international agencies to report on the contribution health care makes to health outcomes. Health interventions do not always create equitable outcomes so agencies have had to focus on reducing health inequalities between different groups as well as addressing conventional goals of increased life expectancy. However, as Barnett and Barnett (2009) point out that it is difficult to measure contributions to health systems and their effects on health outcomes because key indicators of success often conflict with losses in other areas which are detrimental to overall health status of a population.

2.5.3 Public Private Interactions in the Delivery of Hospital Services

Many governments are accepting of the fact that inequalities will be generated as a result of having parallel health systems in which privately funded health insurance operates alongside public provision (Schoen et al., 2000). The belief is common that people should be allowed to spend their own resources as they choose (McLeod et al., 2004a). There has been much debate as to whether private sector participation increases or decreases the burden on the public system. Arguments that the latter are true and have motivated govenments to leave the health market unregulated, in some cases encouraging private participation. Wheras the other side of the argument is that pressures form to restrict and regulate the private sector.

Many have investigated how privatisation affects waiting times for elective proceedures in the public sector. Proponents of private financing in the provision of health care say that the growth of private health providers will shorten wating times for treatment (Bhatia and Natsheh, 2005). However, the majority of research suggests that in countries that have parallel systems such as the UK, New Zealand, and Sweden the problem of waiting times still exists and in areas of high insurance ownership the problem of waiting times seems to

be exacerbated (Tuohy et al., 2002, Columbo and Tepay, 2005, Duckett, 2005).Duckett (2005) argues that strategies to decrease waiting times should be carefully arranged to avoid creating the wrong incentives such that they reward hospitals with long waiting times.

The question of whether private system expansion is supportive or erosive in damaging public provision of health services is very important. A large body of literature seems to support a common notion that privatisation has a detrimental affect on waiting times and the equity of public health systems. Derrett, Bevin, Herbison and Paul's (2009) study found that private provision for the well-off is associated with less access generally to publicly funded elective surgery in New Zealand. The Canadian Health Services Research Foundation (2003) has described the hypothesis that privatisation reduces waiting times as mythical. Duckett (2005) suggests that those drafting policy should be careful about pursuing policies in which expanding private health care is used as a method of reducing waiting times. Vaithianathan (2002) suggests that the answer lies embedded within governments' approaches to regulation within the private sector.

This section has discussed some of the outcomes that have originated from various forms of health service rationing. The next section will discuss some of the ways geographers have approached topics of health service provision and will establish this thesis in the context of some of the wider international literature.

2.6 Overview and Critique of Literature

The field of health geography has traditionally been divided into two distinctive areas of focus. The first being analysis of the spatial distribution of morbidity and mortality and secondly, the geographical complexities around the provision, access to and inequality of health care (Parr, 2003). This thesis seeks to understand the latter strand of health geography, surrounding issues of access and concerns of inequality found within the New Zealand health system. Being able to provide critical geographical analysis of health allows us to consider the implications of conducting research under the watch of the medical profession and in light of the political significance of health policy. In consideration of this health geography seeks to influence those who make or interpret policy to ensure that they make decisions appropriate for the improved provision of health services.

Studies of health care policy concerning issues of access have largely been aligned with analysis of welfare state as seen throughout earlier sections of this chapter (Kearns and Moon, 2002). Throughout the 1990s geographers have discussed the health care implications of neo-liberal policies (Barnett and Barnett, 1999, Moran, 1994, Mohan, 1995b) which has heightened concern for equity under a gradient of health status (Salmond and Crampton, 1999, Hayes, 1999) and for access to services (Van Doorslaer et al., 2006, Earickson, 2000). Outside of health geography much investigation in similar areas had been undertaken independently or in collaboration with other disciplines. The closest relationship probably remains with public health, but there are also strong links with economists, historians, policy analysts, statisticians and sociologists (Kearns and Moon, 2002).

The first objective of this thesis seeks to examine just how access to elective treatments varies spatially across New Zealand. The literature does not visit issues for the provision of elective services, it looks only at other indicators of hospital resourcing, such as the number of hospital beds or the level of funding by region (Barnett, 2000b).

Objective two will identify if certain groups of the population are more likely to suffer less access to these health services according to individual social and demographic characteristics. Geographers have found inequality in the way health resources and services have been allocated between different populations according to their socio-economic status and ethnicity in a variety of different contexts. In the UK, socio-demographic deprivation was found to be associated with lower rates of treatment for lung cancer (Jack et al., 2006). Significant relationships between low diagnosis/treatment rates and socio-economically deprived individuals have also been found in France, Denmark, Switzerland and Japan (Rapiti et al., 2006, Berchi et al., 2004, Norredam et al., 1998, Fukuda et al., 2005). In the US ethnic minorities were shown to have a significantly lower chance of having breast cancer treatment (Haggstrom et al., 2005). Inequalities have not only been found in access to medical treatments but are emphasised by differences in health status and mortality. Inequalities of this sort have been reported by age (Vallgarda, 1999, Schrag et al., 2001), gender (Wall and Owen, 2002a, Barnett and Lauer, 2003), ethnicity (Smedly et al., 2002, House and Williams, 2000, Barnett and Malcolm, 2010) and socio-economic backgrounds (Fuchs, 2004, Fukuda et al., 2004, Marmot and Wilkinson, 1999, Manderbacka et al., 2009, Pearce et al., 2006).

Objective 3 focuses on finding contextual differences which affects the way health care (in particular elective services) are organised and delivered depending on public private interaction in the health sector. This topic has largely been unvisited by geographers and has not been approached in this way before as analysis measures access to health services depending on the public/private mix of a particular region's health services with the exception of Barnett and Barnett over twenty years earlier (Barnett and Barnett, 1989). Overall, the themes approached within this thesis largely fall outside the body of literature that has been approached by health geographers and direct links are forged between the analysis of sociology, economics of health, politics, and public health disciplines.

2.7 Conclusion

The provision of social and welfare services in Western industrialised economies has been widely discussed and reviewed throughout the international literature. Governments' roles in the provision of welfare services have been grouped into 'typologies' by a number of different theorists and according to factors such as societal makeup, political structures and cultural norms. The value that individual governments place on equity, efficiency and effectiveness differs between nations and shapes public involvement in the provision of health services. We have seen that government approaches towards the provision of health care vary significantly between countries despite having common goals and objectives.

Most countries have been subject to common pressures on the hospital sector such as the ageing of world populations, the technological revolution of medicine, issues of supply induced demand and a wide range of inequalities threatening access to care. Governments have responded in different ways dependent on which 'typology' or type of health system they belong to. Some welfare states privatised hospital services to create competition in the anticipation of gains in efficiency. Also, governments enhanced methods of rationing health services including the urbanisation of hospital services, improved filtering of patients, and waiting systems, amongst others. However, these cost saving measures can contribute to further inequalities in the access to quality health services which has led to the continuing debate over the privatisation of health services.

The following chapter will examine similar issues found in the New Zealand health system. New Zealand has a health care system that has been compared closely to that of Britain's NHS in that it has experienced similar reform and exhibits parallel public/private systems in

which the private health sector is seen to complement gaps or discrepancies in the provision of public health services. The author will now examine the role of public and private hospitals in delivering care to New Zealand's population, the long history of hospital and health services restructuring and will look more closely into the impact of privatisation on access to public hospital services.

3 Perspectives on The New Zealand Hospital Sector

3.1 Introduction

New Zealand's hospital sector has been significantly influenced by international pressures and has drawn on other nations' experiences for the adoption of hospital care policies. New Zealand's welfare state origin roughly mimics that of the UK experience not only through its roots of social security and its establishment of a national health system but has also followed similar principles of health service restructuring particularly since the 1980s. The approach has subsequently changed from an emphasis on Keynesian type redistributive policy which focused almost entirely on goals of equity to a mixed model which showed signs of more liberal managerial and market based policy that grew out of goals of efficiency. New Zealand's approach represents a mixture of ideologies reflecting frequent changes in government, rising national health expenditure and growing inequalities in service provision. The outcome has been the creation of a dual public/private system of hospital care of which the public system concentrates its efforts on acute and ambulatory services while leaving the private sector to profit on public sector inadequacies in the provision of elective surgery.

This chapter will provide an overview of the New Zealand health system with particular emphasis on the provision of hospital services. It begins by discussing the origins of the hospital sector and discusses the goals that have become important in New Zealand's adoption of health policy amongst broader welfare principles. Goals of hospital care and implementation of health policy have been widely influenced in New Zealand by inequalities and stretched by pressures that will be discussed in the next section of the chapter. Government responses will then be examined in the form of health service restructuring and various types of rationing that have taken place to curtail growing public expenditure on health care. Finally, the outcomes of health service restructuring will be observed by taking a look at the current state of the hospital sector and by examining the interaction that takes place between the public and private hospital sectors.

3.2 Hospital Care in New Zealand

3.2.1 The Beginnings of Health and Disability Services

As in many other countries, hospital care contributes the bulk of New Zealand's health expenditure. The government has played a dominant role in determining the development of New Zealand's health care system, especially since the Social Security Act was passed in 1938. This section will discuss the development of New Zealand's health system particularly focusing on the evolving role of hospitals in the delivery of health services. Secondly, it will examine some of the goals that the New Zealand government has adopted to achieve higher health outcomes and service delivery to the population. Finally, New Zealand's health system will be compared to other countries in terms of its welfarist principles and alignment to concerns of social security.

The New Zealand hospital sector was formed in 1846 when George Grey, the Governor General at the time, commissioned four district hospitals built to serve Maori populations and the poor (Gauld, 2009). Hospitals of this period were considered as places to keep away from, only to be resorted to in acts of desperation (Dew and Kirkman, 2007b). While the government moved to establish hospital facilities it encouraged private provision and supported voluntary agents (McGuigan, 1975). In 1872 the first Public Health Act was passed in reaction to increases in population, ineffective service provision and in the realisation that hospital services would not develop in an organised way without government intervention. By the 1880s around three quarters of hospital care expenditure was being funded by government. In 1885 the Hospital and Charitable Institutions Act was signed which meant that health funding became a local responsibility subsidised by government contributions. As a result inequalities in patient access to hospital care grew substantially as a result of regional differences in funding. State contributions also fell almost by 50% in the years 1884 and 1886 (Gauld, 2009).

In the 1880s The British Medical Association of New Zealand (BMANZ) was founded to 'professionalise' medicine. This development was very important in the development of New Zealand's health system as this agent became very powerful in lobbying for the profession and for the private interests of individual physicians (Gauld, 2009). At the turn of the 20th century the government was persuaded that local finance of the health sector was inefficient and began taking back control of health administration. In 1918 the BMANZ suggested a 'Toronto Scheme' be adopted in the New Zealand context, an idea where hospitals would

provide separate premises to provide facilities for private patients who would pay a negotiated fee according to the treatments required. Profits were to be reinvested into the hospital (Dow, 1995). This set the scene for a system in which physicians enjoyed lucrative FFS treatments as complementary source of income outside salaried work done in the public sector. The Department of Health was established in 1920 and health care was restructured into seven public health divisions to acknowledge a growing belief that hospitals should provide both curative and preventative services within primary, secondary and tertiary sectors.

As a result of the social and economic hardship that grew out of the great depression there was increasing pressure to renew the health system (Gauld, 2009). Michael Joseph Savage's Labour Party promised universal publicly provided hospital services and primary care in their election campaign of 1935 which threatened the private interests of physicians. Subsequently, significant resistance was generated by the BMANZ . However, a compromise was reached between The first Labour Government and the medical profession in the signing of the Social Security Act of 1938 which aimed to provide a comprehensive state funded health service (French, 1977, Dow, 1995). The act provided for 'free' access to hospital care but its provision remained very unequal. As a result of resistance met by the medical profession, the state was not able to completely deliver on its promises of a unified state funded and coordinated health service, so a dual system emerged in which public and private sectors were to operate in tandem providing both primary and secondary services.

In 1941, the Government established the general medical services (GMS) benefit system in which offered subsidies to GPs for the provision of primary services but GPs were also allowed to charge a fee per consultation up to one third above the GMS (Dew and Kirkman, 2007b). In the hospital sector the influence of social security legislation meant the reduction of private participation in the hospital sector. Between 1938 and 1948 private hospital sector participation decreased from 22.1% to 15% and some of the existing facilities were taken by the public sector and others were disestablished (McGuigan, 1975). Over a similar period the government's contribution towards hospital services doubled from 39% to 73% of its total health expenditure.

The 1950s saw the election of a National Government which sought to reinvest money into the dwindling private sector. Encouraged by the understanding that every private bed filled was one that the state did not have to provide, the government came up with a number of

initiatives (Hay, 1989). The state introduced grants for the establishment of new institutions and capabilities in private medicine and introduced 'maintenance subsidies' for private providers. As the private sector re-established into the 1960s, the distinction between public and private and primary and secondary care became clearer. By the 1970s private institutions contributed 20% of all hospital beds. Generally patients paid for this care through memberships to private health insurance schemes. From goals of the first Labour Government, e.g. social security and principles of access in accordance to need there came a fragmented health system in which the private sector had re-emerged and access was largely determined in accordance with ability to pay. During this period public hospital coverage had improved but public perception of the system compared with private services had declined significantly (Gauld, 2009). By the 1980s 48% of New Zealanders were holders of private medical insurance policies which were purchased primarily in order to enable better access to primary care and specialist consultations (Hay, 1989).

In 1967 the first national funding formula was introduced for the allocation of funds to Hospital Boards, which had previously been sought from local rates. The allocation was set according to bed supply rather than indicators of health needs. As a result there were large variations in funding which meant some regions were better served than others and growing waiting lists for non-urgent surgical procedures (Barnett et al., 1980). The third Labour government (1972-1975) successfully campaigned on the problematic state of the health service and went on to begin a series of reviews within the system, conducted by the Department of Health. The recommendations were configured in the form of a White Paper, 'A Health Service for New Zealand' (McGuigan, 1975), which formed a template for the reform of the health sector. Labour's White Paper suggested a focus on preventative medicine, the integration of health services and establishment of a system that is determined according to need and not ability to pay. However, sections of the White Paper were unsupported by the medical profession to the extent that it launched a campaign to discredit the government much like in the way that it had done in the wake of the 1938 Social Security Act (Gauld, 2009).

The succeeding National government (1975-1984) favoured corporatist methods which meant collaborating with established interest groups within the medical community such as the New Zealand Medical Association which had resisted proposals put forward by the previous Labour Government (Gauld, 2009). The National Government stimulated the private sector by extending private bed subsidies to geriatric care in 1977 and in 1982 with

the introduction of an 'approved procedures list', which gave doctors the power to refer patients who required surgery in a specialty that experienced high waiting lists directly to private hospitals where services could be obtained promptly. This was subsequently cancelled in 1987 when spending on such services was deemed unsustainable (Barnett and Barnett, 1989). The political and financial costs of a supply driven allocation system led to the introduction of two major changes to hospital services in 1983. These were the introduction of population-based funding and the establishment of area health boards (AHBs) which were further developed throughout the 1980s. Population-based funding aimed to cap expenditure to stop the open-ended spending that had occurred since 1938.

Some minor health restructuring occurred in 1989 with the final integration of elected, regionally based AHBs which aimed to integrate population health and hospital services. Improvements in performance and accountability represented broad goals of public sector restructuring. Despite the introduction of general management tools, result orientated reporting capped budgets and informal contracts between AHBs and the Minister of Health (Beaglehole and Davis, 1992), expenditure in health continued to increase throughout the 1980s (Malcolm, 1993). In 1990 National was elected and begun a radical agenda of liberalisation including the privatisation of state assets and deregulation of the labour market (Barnett, 1999). This episode of reform in the beginning in the early 1990's kicked off a 'turbulent decade' which spelt a period of repeated change for New Zealand's health sector (Barnett and Barnett, 2003a). This period of change will be further discussed later in this chapter.

3.2.2 Goals of Hospital Care in New Zealand

Equity, efficiency and effectiveness were discussed throughout Chapter 2 and are goals of health service restructuring and more generally overall objectives of national health systems. New Zealand's health care system follows that of a redistributive model guaranteeing universal access to a wide variety of hospital and community services (Pinch, 1997). The redistributive model places great emphasis on equity of service provision to redirect resources towards population need. The redistributive framework was underwritten by the 1938 Social Security Act which promised all New Zealand citizens in need, free access to appropriate treatment as identified by health professionals. In doing so, New Zealand was the first nation to introduce a universal system of free inpatient treatments (Somjen, 2000). Health expenditure was to be funded through progressive taxation in order to offer the direct

provision of hospital care together with a parallel system of subsidies for the use of primary care (Fougere, 2001).

Since the post-depression move to enact the Social Security Act in 1938 two political parties have pursued slightly different policy objectives during their time in office. The Labour Party has been a long-time advocate of redistributive social security policy which promotes goals of equity to ensure universal coverage throughout the population. Whereas, National are strong supporters of market principles to improve the efficiency and effectiveness of hospital systems. This was demonstrated in the 1950s when National encouraged the growth of the private hospital sector in the belief that efficiencies would flow through to the public sector (Hay, 1989). This turns our attention to the way that New Zealand's health system has grown out of governments' adoption of certain welfare principles.

3.2.3 New Zealand's Adoption of the Welfare State

The 1938 Social Security Act signified a strong move by the first Labour government to adopt the principles of the Keynesian welfare state. As described in the previous chapter few countries fit perfectly into typologies but adopt more of a mixed approach to the provision of welfare services (Blank and Burau, 2007). While New Zealand has strong social security roots it also has adopted some more liberal consumer sovereignty principles particularly during National Party governance. Towards the later part of the 20th Century globalisation and a convergence of ideologies has had consequences for the organisation of welfare (Mohan, 2003). Barnett and Barnett (2003a) suggest New Zealand like the UK represents a 'middle way' in that it has a mix of both public and private finance and services, particularly in surgical services, primary, and geriatric care.

Authors have argued that welfare regimes are evolving away from the traditional Keynesian welfare national state towards a 'Schumpeterian workfare post-national regime' (Jessop, 1999). The Schumpeterian workfare state incorporated the goal of raising the structural competitiveness of New Zealand's economy, manipulating the supply side by reducing expenditure in welfare and focussing attention of the needs of the labour market (Barnett, 1999). Such a suggestion has attracted significant discussion from geographers especially these forms of welfare and hospital restructuring (Barnett, 2000a, Barnett and Barnett, 1999, Barnett and Barnett, 1989, Barnett and Barnett, 2005, Joseph and Kearns, 1996, Fougere, 2001, Gauld, 2009). These authors work will be further discussed in later sections of this chapter.

As seen in Chapter 2, convergence in the policy used to govern health systems is widely seen throughout developed nations. Convergence is naturally helpful as governments search for solutions to common problems seen in other countries. As New Zealand's government has limited resources and tools available, the formation of policy is very much based on ideas obtained from overseas. Gibson and Means (2000) argue that policy levers are scarce and there only so many ways to solve a specific problem. The fact that most health systems have common challenges in performing different functions means that New Zealand like many other nations tend to build on overseas health policy for its own. Various health systems and countries are all faced with the common goals of ensuring equity/access, quality and cost containment of provision. The relative importance that the government places on each of these factors determines the direction of national health policy in each country (Blank and Burau, 2007).

New Zealand's hospital sector rose out of the 1938 Social Security Act which offered universal access to inpatient hospital services. Since then public and private hospitals have since evolved in a complementary fashion. The public system provides both acute and non-acute or elective services. However, acute services and emergency services have traditionally taken priority and demanded most resources out of the public sector and subsequently long waiting lists have been generated for elective services (Dew and Kirkman, 2007b). Private hospitals have taken advantage of high demand so to specialise in these procedures. As seen in Chapter 2, various pressures have affected the hospital sector. The next section will discuss these pressures further in the New Zealand context and set the scene for a significant period of restructuring in the hospital sector.

3.3 Pressures on the New Zealand Hospital Sector

Since the adoption of the 1938 Social Security Act, New Zealand has aimed to provide a comprehensive publicly funded health service which provided treatments in accordance with individual need. During which, the ageing of the New Zealand population, the increasing availability of expensive technologies and treatments and a growing propensity to demand more care has meant that subsequent governments have had to pay greater attention to growing health expenditure (Gauld and Derrett, 2000). Public hospital coverage has increased over time but since the establishment and growth of a private hospital sector the public perception of the state funded health service has been in decline (Gauld, 2009).

This section will discuss the pressures felt by the hospital sector in the context of New Zealand. These include issues of demographic change, technological improvement, rising expectations, waiting lists, funding issues, shortages of qualified medical staff and avoidable hospital admissions. The second part of the section will look at inequalities of access to hospital care in New Zealand. This is very much a pressure felt by government as it aims to produce equitable outcomes to its citizens. Major inequalities that will be discussed follow socio-economic and ethnic considerations. Particular mention will be made of Pacific Island and indigenous Maori populations and their poor access to inpatient care.

3.3.1 Pressures Felt by the Hospital Sector

Chapter 2 discussed some important factors which are placing pressure on the hospital sector. Summarised below are some of the pressures experienced particularly in the New Zealand context. The pressures are largely based on efficiency and equity concerns. Efficiency related to the increasing cost, and propensity to consume high quality inpatient care; equity related to inequalities and exclusion that arise as certain groups fail to access sufficient hospital care. Both are factors that put huge stress on the New Zealand hospital sector.

Ageing Population

The post-war baby boom placed increasing pressure on public hospitals as free maternity care was initiated by the 1938 Social Security Act. Later on, the post-war baby boom was having a more profound effect on health expenditure. Due to changes in the age profile of the New Zealand population there has been a large increase in the demand for geriatric care. The concentration of treatment is shifting from young to elderly as New Zealand's population ages (Gauld, 2009).

Rising Expectations

While free hospital services had been established following the enactment of the 1938 legislation, the newly established publicly funded health system failed to satisfy the demand for new treatments (Davis, 1981). As technology increased in the health sector, the pace of service expansion funded by public expenditure fell behind the public's rising expectations for hospital care in New Zealand. Later on much of this perception became fuelled by the belief that the public health system was deteriorating (Department of Health, 1969). The

growth of patient waiting lists for non-urgent medical and surgical treatments made it clear that demand had outstripped the supply of affordable hospital services (Fougere, 1984). As seen above the private hospital sector experienced steady expansion through the 1950s and 1960s and so did the private health insurance market through which people exited the public sector to gain better access to surgery. This drained resources away from the public hospital sector further inflating problems for public sector capacity and contributing to the further growth of waiting lists.

Waiting Lists

Well established in New Zealand as in other countries has been the excess in demand for elective surgery over the supply of publicly funded health resources used to provide these services (Hay, 1989, European Observatory on Health Care Systems, 1999). Waiting lists can be conceptualised as a pressure for hospital systems and also as a response in the form of rationing. By 1973, 33,000 patients found themselves on waiting lists (Fraser et al., 1993), by 1987 that figure had grown to over 50,000 (McKendry et al., 1993). This showed that the gap was increasing between government funding and the service funding required to provide non-essential surgery. The issue of waiting lists has been an enduring issue faced by the public health sector in New Zealand (Hospital and Related Service Taskforce, 1988). Between 1982 and 1992 waiting lists in New Zealand doubled even despite significant increases of throughout during the same period (Gauld and Derrett, 2000).

Funding Problems

Throughout the 1950s, the centralisation of funding which had been proposed by the Hospitals Amendment Act 1951 meant government faced increasing pressure from hospital providers to raise funding which it was unable to meet (Hay, 1989). Typically rural centres have greater elective surgery capacity and are able to meet surgical volumes while urban centres tend to be dominated by acute workloads (Roake, 2003). Historically, the expansion of the private sector has filled the gaps in the market where the public sector has struggled to ensure access to elective services (Derrett et al., 2009). Geographically this has meant private interests clustered around large centres such as Auckland, Wellington and Christchurch where resources are stretched in the public provision of elective surgery. This further drew resources away from the public sector in the areas of most need.

Shortage of Medical Professionals

Immediately following the 1938 Social Security Act the percentage of hospital-based professionals increased significantly to keep up with the demand of new specialised services and technology. The public hospital-based workforce had grown from 7,763 in 1952 to 15,183 in 1969 (Department of Health, 1969). However, despite high rates of medical expenditure many areas have begun facing acute shortages of doctors which have meant policy concerns have shifted from equity to efficiency issues. Barnett (1991) argues that recent New Zealand medicine graduates have favoured urban areas therefore leaving rural areas inadequately served. Rural areas are facing insufficient access to health services in New Zealand particularly in primary care (Panelli et al., 2005). However, the distance from urban settlements is also a leading factor leading to difficulties for access to secondary health care (Kearns et al., 2006).

Avoidable Hospital Admissions

As mentioned in the previous chapter hospitals face avoidable hospital admissions when patients are left without immediate access to primary care for early detection (Sheerin et al., 2006, Nolte and McKee, 2000). Many conditions which may have otherwise been effectively dealt with are not and so patients deteriorate to the point where they require hospital care. Much of the problems that lead to this phenomenon arise out of inequalities in the health system which are discussed below.

3.3.2 Inequalities in the Hospital Sector

Socio-economic Inequalities

Not only do people living in the most deprived areas have a lower life expectancy but also higher morbidity and hospital admission rates compared to the remainder of the population (Dew and Kirkman, 2007a). Increased social polarisation caused by increased poverty and problems of access to primary care have meant that more deprived communities have lacked access to health services (Barnett and Lauer, 2003). The two-tier structure of the New Zealand health system contributes inherent inequities through ability to pay for primary and secondary care. User fees are commonly found throughout the public system and force people to rely heavily on private health insurance to supplement public benefits including more ready access to primary care, specialist consultations and hospital treatments (Schoen

et al., 2000). In particular, patients from lower socio-economic backgrounds are likely to be disadvantaged as they are left unable to afford to purchase private care so are left waiting until their condition deteriorates (McLeod et al., 2004a). Schoen et al., (2000) found that throughout New Zealand, lower income groups were nearly two times more likely to report difficulties seeing a specialist (44% vs. 24%).

Maori and Pacific Island Inequalities

Maori and Pacific Islanders who are over represented in lower socio-economic groups (Salmond and Crampton, 1999), are less likely to have health insurance (Kokiri, 2000) and as a result are less likely to access the private sector (Ministry of Health, 1999). The economic reforms of the 1980s also meant that incomes for Maori declined in relation to other New Zealander's (Brown, 1999), as Maori tend to concentrate in manual occupations such as meat works which were more negatively affected during the reforms. Not only this, Salmond and Crampton (2000) found that Maori are more likely to develop symptoms and die earlier than other New Zealanders living at a similar level of deprivation. Maori and Pacific islanders generally face higher rates of morbidity (Howden-Chapman and Tobias, 1999) and mortality (Ajwani et al., 2003) than any other the ethnic group in New Zealand society. Risk factors include high behavioural influences like smoking, obesity and overcrowded living conditions and also measures of exclusion in that these ethnic groups suffer a lower chance of accessing health care (Dew and Kirkman, 2007a).

New Zealand is not immune to the pressures that international health systems have faced over the past half century. The rising cost of hospital care has been driven by demographic changes, increases in technology and the increasing expectations that society places on these systems. Unfortunately, the pressure government faces by increases in expenditure have impacted on the equity of hospital provision in New Zealand. Social inequalities have become increasingly prevalent as government has attempted to remedy efficiency concerns. The next section will discuss responses made by government through the 1990s on behalf of the hospital sector, a period which has been described as the 'turbulent decade' (Barnett and Barnett, 2003a).

3.4 Responses made by Government on Behalf of the New Zealand Hospital Sector

In the previous two sections of this chapter we have seen how the New Zealand hospital sector has evolved, and the pressures that it has encountered due to the increasing costs and demands on the health care system combined with inequalities seen as some groups face less access to care and therefore suffer from preventable illnesses. Since the 1990s successive governments have focused efforts on improving the equity and efficiency of the New Zealand hospital system during which there have been repeated efforts to reform the health sector.

This next section discusses how the New Zealand Government has moved to restructure the hospital sector and the particular methods it has adopted to realise goals of equity and efficiency. The first part will discuss in chronological order the path that restructuring has taken over the past two decades and the second will discuss in some more detail some of the methods that governments have used to support progress in the hospital sector. Finally the third part will discuss some ways that the hospital sector has rationed particular services, an important process, used explicitly to curtail government spending.

3.4.1 A Hospital Sector in Change

Despite the reforms of the 1980s, in 1993 the New Zealand health system retained a structure based on the 1938 Social Security Act i.e., a national health system of which universal health coverage was offered in accordance with individual need (Fougere, 2001). When the National government was elected in 1990 they continued Labour's approach to economic liberalisation with the sale of private assets and further deregulation of the labour market (Barnett, 1999). However, National's approach to welfare went far further with the introduction of a number of new tools targeting the efficiency of social services, particularly in housing, health and education (Boston et al., 1999). Kelsey (1997) describes National's approach as a 'blitzkrieg' course of economic and social reform. Increasingly social welfare services would be governed under tighter constraints with the government enforcing greater liability and fiscal constraints (Barnett, 1999). In summary, a hospital system of representation and access was replaced by one of monitoring and accountability (LeHeron and Pawson, 1996, Lewis and Moran, 1998).

In 1993 the government moved to introduce competitive processes into the hospital system, to encourage service integration between primary and secondary care and to devolve control from central government toward the regions (Barnett and Barnett, 2003b). The Gibbs Report produced by the Hospital and Related Services Taskforce (1988) had been discarded by the previous Labour Government but became essential to National's neo-liberal agenda (Barnett, 2000b). This approach seemed to be a mixture of the best performing policy from the market and from managerialism established in the early 1980s (Barnett and Barnett, 2003a).

Under what has been termed the 'big bang policy', the system of AHBs were abolished in place of 23 Crown Health Enterprises (CHEs), four Regional Health Authorities (RHA's), a centrally based Ministry of Health (MoH) and a Public Health Commission under recommendation from a Green and White Paper (1991) (Gauld, 2009). In this arrangement purchaser RHAs were separated from provider CHEs with the intention of increasing competition among providers (Bloom, 2000). RHAs were allocated a single capped budget according to a population-based formula to spend on hospital services that were to be provided by CHEs (Fougere, 2001).

The move towards the internal market and elements of corporatisation did not pay off (Barnett, 1999). In the years following these 1993 reforms efficiency gains were less than expected, and public expenditure on hospital services increased rather than declined. Although the public private split meant it was possible for RHAs to put surgical procedures out to tender, few public contracts were purchased by the private sector due to the RHAs offering low prices and the relatively small volumes involved (Barnett and Barnett, 2003a).

As a result of accusations of gross inefficiency, poor targeting and provider capture government moved again to reform the health sector in 1993. The election of a new National-led Coalition Government in 1996 signalled the beginning of a retreat from the market ideology as a result of widespread public concern over the poor performance within the health sector and the government's failure to deal with waiting lists. Treasury released a report indicating growing waiting lists for elective services and large disparities between the health outcomes of different groups (particularly Maori and Pacific Islanders) (Treasury, 1996).

RHAs were merged centrally into the Health Funding Authority (HFA) and the twenty-three Crown Health Enterprises (CHEs) were renamed Hospital and Health Services (HHS)

(Barnett and Barnett, 2003a). During this shift came the abandonment of the language of the market, customers becoming patients once again. The aims were to encourage efficiency and innovation, improve access, widen choice of services, enhance the work environment of health professionals and to increase the sensitivity of the system in meeting the changing demands of the New Zealand public (Barnett and Barnett, 2005). The first year of the Coalition Government saw large increases in health expenditure (Ministry of Health, 2002), which represented a funding boost for mental health services, surgical waiting lists and promises of universal free access to under six year olds (Barnett and Barnett, 2003a).

Since the election of a new Labour-led Coalition Government in 1999 New Zealand has seen a further retreat from the market. Prior to the election, the public sought health spending that would lead to services that would be fully tax payer funded (New Zealand Election Study, 2000). Labour pledged to restructure the health system so that public and professional confidence could be restored (Donelan et al., 1999). Since the election, the Coalition introduced an innovative policy framework which represent a new and distinctive 'third-way' or 'pick and mix' agenda was introduced similar to what was adopted by the UK's NHS (Barnett, 1999).

The principles of spending, competition, and accountability re-emerged combined with a renewed focus on health goals (Powell, 1999, Powell, 2000). However, competition was to make way for cooperation and bottom-up strategies were aimed to target certain high priority groups in certain areas (Gauld, 2009). The new government retained elements of the purchaser/provider split while encouraging planning and cooperation. The HFA and HHSs were removed in favour of twenty-one District Health Boards (DHBs) which report directly to the Ministry of Health (MoH) which provides population-based funding . District health boards were to be democratically elected as was the case under the AHB arrangement (Barnett and Barnett, 2003a).

The development of the 'New Zealand Health Strategy' (Ministry of Health, 2000) signified the new broader vision emphasising health goals, increased access to health services, reductions in ethnic inequalities and inter-agency cooperation to achieve these goals (Barnett and Barnett, 2003a). The key aims were to improve health status and to reduce inequalities in health (King, 2000). Labour was subsequently in office for three terms of which provided a period of relative stability for the health sector compared to the 1990s. Labour's aim for improved population health meant that the Coalition invested heavily in

primary health over this period. However, emphasis for the integration between primary care and hospital services remained a priority throughout this period. Government also devoted large amounts of money to elective surgery, specifically scoring systems as discussed in the following chapter but research indicated that the spending did not translate into front line services (Gauld, 2009). During the period 2001 to 2006 the number of elective surgery discharges had only increased from 199 to 207 procedures per 10,000 people (Hansard, 6 August, 2008).

During the National Party's pre-election health plan of 2008 it was proposed that greater use would be made of the private sector to cut public waiting times (Thomas, 2009, Key, 2008). John Key (2008) stated that: "…*fewer operations are being performed per capita, and the average waiting time has increased from 55 days in 2002 to 75 days now. We need to boost the number of elective surgeries performed in the public and private hospitals, expand the services that primary care delivers, and carefully invest in new elective capacity in the public health system."*

Promises were made to:

- build 20 new dedicated elective surgery theatres with associated beds and facilities over the next five years (cost: $36 million per year over five years)
- target investment where it will provide the greatest boost in elective surgery
- train 800 additional medical professionals (estimated cost $20 million a year)
- encourage the smarter use of private hospitals to support elective surgery in public hospitals
- encourage GPs with special skills to provide a wider range of minor surgery in their clinics and improve direct referral to some diagnostic tests
- delegate funding to kick-start the devolution of services to primary care (cost: $13 million a year) (Key, 2008).

In 2008 National, and its leader Prime Minister John Key, was elected to lead a Coalition Government along with the Association of Consumers and Taxpayers (ACT) and the Maori Party. Since then, New Zealand has experienced recession and the National led government has moved to reduce bureaucracy with the intention of increasing in front line services. The Minister of Health, Tony Ryall has also signalled a move away from primary care with large cuts to *primary health organisations* (PHOs) nationwide despite the improvements they have

made to the health of New Zealanders, which Ken Whelan, the Chief Executive of the Capital and Coast DHB, believes could not have been achieved otherwise (Newton, 2010). A wide variety of these decisions have been made over the past two decades and each forms a different type of health service restructuring. The next section discusses some of the ways governments have sought to reorganise the New Zealand public health system to better serve the country.

3.4.2 Forms of Health Service Restructuring

Needs-based funding

Needs-based funding was adopted by the first Labour Government through the enactment of the Social Security Act in 1938. As stated above this policy was pursued until the introduction of 'new right' philosophies and the eventual managerial revolution and introduction of the market in the 1990s (Barnett and Barnett, 2005). Needs-based funding represents early approaches in which governments sought to provide universal and equitable access to hospital services as underpinned like other social services in the Keynesian welfare state (Barnett and Barnett, 2009). In the years between 1999 and 2008 in which New Zealand was governed by a Labour-led Coalition restructuring in the health sector resembled a move back towards a needs-based methods of funding (Gauld, 2009).

New Public Management (NPM)

The introduction of *new public management* (NPM) was limited to Labour's 1980s reforms and did not follow through to the post-1990 National Government. The establishment of AHBs represented a form of NPM in which introduced contractual arrangements and a business orientated approach to managing health resources (Barnett and Barnett, 2003a). This was a common theme throughout the state sector in the 1980s in which contracting, accountability and performance monitoring became enforced by the State Sector Act (1988) and the Public Finance Act (1989), which covered AHBs (Boston et al., 1996). Health goals and targets now established a new concentration on health goals (Beaglehole and Davis, 1992).

Devolution

Devolution was a key tool used by central government in the 1980s to make AHBs accountable for health budgets, service outputs and responsibility for local health status (Barnett, 1999, Barnett, 2000b). It remained an important part of health service restructuring throughout the 1990s as governments tossed and turned over the level of decentralisation required for the hospital sector. RHAs took over AHBs in 1993 and in 1996 the government moved to centralize control of hospital services with the establishment of the HFA. In 2000 a new government reverted to a decentralised health authority once again by splitting the HFA into 21 DHBs as seen above (Barnett and Barnett, 2005).

Deinstitutionalisation

We have seen in Chapter 2 how deinstitutionalisation transformed psychiatric health care in New Zealand and other contexts through the 1960s and 1970s (Kearns and Joseph, 2000, Joseph and Kearns, 1996). Rationalisation is also a form of deinstitutionalisation that is discussed widely in New Zealand contexts as a response of health service restructuring involving the closure and centralisation of services (Barnett and Barnett, 2009). Rationalisation is a cost saving measure traditionally exercised by the closing or downsizing of services in peripheral hospitals in conjunction with the introduction of the internal market in 1993 (Barnett, 2000b). Services are rationalised in order to support unrealised economies of scale and the release of selected responsibilities through elements of privatisation to reduce costs and to provide a greater choice for consumers (Kearns and Barnett, 1992, Joseph and Chalmers, 1995). Rationalisation has widely affected service provision at the local level and the geography of hospital services throughout New Zealand (Barnett and Barnett, 2003a).

Internal Markets

As mentioned above one of the main goals of the 1993 reforms was to introduce more competitive processes into the hospital system (Barnett, 2000a). The internal market was introduced and led to a number of important changes for the hospital sector (Barnett, 2000a). The internal market led to the separation of purchasers and providers in which RHAs purchased health and disability services for the population within their designated region from an array of public, private and voluntary providers. 23 CHE corporate providers were established each with a government appointed board of directors made up primarily of

private sector executives, few having prior experience in the health sector. This new system exposed traditional providers as private and voluntary agents became able to negotiate contracts for publicly funded services. The governments priorities shifted from social responsibility and acknowledgement of local needs to goals of productivity and efficiency in the provision of hospital services (Barnett and Barnett, 2003a).

Privatisation of Hospital Services

The roots of the private hospital sector come out of the 1950s when the National Government begun to subsidise private hospitals to produce an alternative to public hospitals, in the hope of reducing costs in the public system (Hay, 1989). The private sector has since performed a complementary function to services provided by the public sector (Dew and Kirkman, 2007b). Privatisation was an important part of the 1993 National-led reforms in the process of the creation of the internal market as greater use is made of both private and voluntary sectors to the provision of services (Barnett and Barnett, 2009). Since the internal market was retired in 1996, governments have focused on the quality and outputs of public services. It is only since National was re-elected in 2008 that elements of privatisation are sneaking back into the political agenda. The National government has specifically warranted the use of private services for the support of public elective services and the establishment of public-private partnerships to fund new hospitals via the public float of the New Zealand Social Infrastructure Fund (SIF) (Newfield and Coman, 2010).

3.4.3 Rationing

Rationing by Denial or Exclusion

Rationalisation is one of the mechanisms since in the late 1980s by New Zealand government to increase the efficiency of hospital services. This intensified following the 1993 reforms when corporate managers moved to downgrade or close down hospital services (Barnett, 1999). Pressures of service closure were greatest in southern regions and the midlands where population is spread over large areas and hospitals ran large deficits due to new population based funding formulas introduced in the 1980s (Barnett and Barnett, 2003b). Rationalisation in these areas has led to inconsistencies in service access and elective surgical waiting lists (Barnett and Barnett, 2003a).

Rural communities have been particularly hard hit by rationalisation as the urbanisation of hospital care tends to place constraints on patients' access to care because of the clear implications for less mobile rural residents (Joseph and Chalmers, 1995, Kearns and Joseph, 1997). However, during the 1993 reforms government gave the option to local communities to establish 'community trusts' to avoid the closure of community hospitals (Gauld, 2009). By late 1998 nine community trusts had been set up in the Southland region (Barnett and Barnett, 2003b). In 1998 services were again prioritised away from those deemed to be of 'core-service' and referred to those that did not meet criteria as 'financially unviable' hospital beds. These services included midwifery, sexual health, and a wide array of services in provincial hospitals. However, some were taken over by community boards (Gauld, 2009).

Rationing by Filtering

Like many other countries New Zealand uses primary care to filter out those who are healthy from those in need of treatment and send the latter to the appropriate service whether it be hospital, other primary care (i.e. physiotherapy) or for tertiary treatments. This gatekeeper role plays an important part in controlling the wider health system against over utilisation and expenditure (Brown, 1988, Blank, 1994). The persistent problems with waiting lists (discussed below) has led government to develop national guidelines for the prioritisation of patients. New Zealand has a reputation as a world leader for the progress of scoring and booking systems (Gauld, 2009). The following chapter will discuss the development of the New Zealand Booking System (NZBS), a system that has been created to filter patients needing elective surgery.

Rationing by Imposing Cost

Rationing by imposing cost in the New Zealand context is most widely used for the FFS payments throughout the health sector. Following the 1938 Social Security Act a large array of primary and secondary health care was offered free to the public and drew an unsustainable demand. In 1941, government introduced the general medical services (GMS) subsidy which transformed free care into subsidised primary care in which physicians could initially charge patients up to one third above the subsidy (Gauld, 2009). This went some way towards solving the problems of moral hazard and subsequent overuse of services.

In the hospital sector, government moves to adopt a neo-liberal agenda of privatisation have made access to particular elective treatments costly. Some patients are denied access and others face large delays for access to elective procedures in the public sector and so are forced to exit and seek assistance from private hospitals (Fougere, 1974). Unless patients own private health insurance they may face large fees which contributes further to the inequalities mentioned in previous sections. Now that technology has reached its current level government has to place a limit on the amount of services it can provide and leave the remainder to the private sector to supply patients who are willing to pay top dollar for prompt and effective service.

Rationing by Waiting

As mentioned above, waiting lists are a natural response for governments as demand overshadows supply the provision of publicly funded elective services. Waiting lists grew significantly during the 1980s and continued in an upward trend through the 1990s (Barnett and Barnett, 2003a). In 1973 there were 33,000 patients waiting for surgery and by 1995 this figure had more than doubled to 85,574 (Gauld and Derrett, 2000). Concern that the system of prioritisation was failing to produce suitable rankings were realised in the late 1990s with many New Zealander's suffering from severe conditions waiting for significant periods of time, lost within lengthy waiting lists (Derrett et al., 2003).

One problem had been developing a system to manage waiting lists that was more equitable than the one being used at the time. The government wished to gain national consistency of access for elective surgery by prioritising patients with explicit criteria so that patients of equal need have similar access, to create patient certainty for their prospects of surgery and to show transparency as to the size and duration of waiting lists (Derrett et al., 2003). Calls were made to introduce a prioritisation system in 1998 that would allocate services more effectively to patients in need. This is discussed further in the following chapter. Despite the huge effort and tens of millions of dollars that was invested into the development of prioritisation mechanisms Hunter (1997) and Mechanic (1997) argue that waiting lists or waiting times may always remain a part of New Zealand's public health system.

Rationing by Limiting Quality

The 1990s saw the introduction of managed care in New Zealand for PHC through the development of *independent practitioner associations* (IPAs) (Barnett and Copeland, 2009).

IPAs, were owned and run by their members and modelled themselves on similar groups in the US that performed collective action against corporatisation in the 1980s (McKinlay and Stoeckle, 1988). IPA members are bound by group protocols to enter into negotiations with funders regarding the limits of their spending on pharmaceuticals and lab tests. The group can then put in place their own monitoring systems and have an effect on individual expenditure by GPs (Kerr et al., 1996).

The government incentivised IPAs to reduce expenditure by allowing them to spend any savings they made not already contracted for (e.g., reducing patient fees, elective surgery for selected patients, providing community services etc.) (Dew and Kirkman, 2007b). By 1995, 50% of GPs were IPA affiliates (Malcolm and Powell, 1996), and by 1999 this figure rose to 70% (Malcolm et al., 1999). IPAs were soon superseded by *Public Health Organisations* (PHOs) as the New Zealand government showed a renewed interest in preventative medicine and moves to strengthen primary care. The establishment of these types of collective organisations has delivered important efficiency gains sometimes at the expense of equity considerations (Barnett and Copeland, 2009).

Since the 1990s New Zealand's health sector has experienced significant changes as governments have made repeated efforts at restructuring health services. This section has discussed the path that the New Zealand health sector has taken over the last two decades and highlighted periods of reform. Various types of health service restructuring were then examined taking a brief look at how they have taken shape in the New Zealand hospital sector. Finally, methods of rationing were considered so to explain how the health system has responded to pressure on the hospital sector.

3.5 Outcomes

We have seen in above sections how the 1990s brought large scale changes in the provision of hospital services. The creation of a parallel public/private system has since established a system in which access has become the number one concern for everyday New Zealanders. Since the government has failed to curtail rising public expenditure it has been forced to into rationing hospital services which has contributed to increased waiting lists and rationalisation of services. The private hospital sector has become increasingly important to deliver services and to keep up with the demand that the public sector is being placed under. However, there has been a significant amount of research that has suggested that growth in

the private sector has had negative consequences for the public sector as mentioned in Chapter 2.

This section will discuss some of the outcomes that the New Zealand hospital system has generated, including problems of access specifically to elective services. The private hospital sector which has co-existed with the public sector since the enactment of the Social Security Act in 1938 is discussed with particular focus on the market for private health insurance Finally, relationships between the public and private sectors are examined along with implications on public hospital for their sustainability to deliver elective surgery.

3.5.1 New Zealand Hospital Systems and Health Outcomes

Post 2000 the rationale for the decentralisation of decision making was meant to facilitate closeness to the community to meet the needs of local populations. The population-based funding formula means that populations of a similar size, despite population spread are allocated the same level of funding. This means rural populations have faced difficulties sustaining high quality medical services. Some DHBs have had to rationalise services, others have looked at ways they can share services such as sharing specialist staff and resources thus thinking 'regionally, not locally' (DHBNZ, 2008). For example, the establishment of regional specialist centres where DHBs decide to share funding and access to certain services. One of these is found in the Hutt Hospital specialist centre for plastic and reconstructive surgery, a service that is shared by several DHBs of the lower North Island (Gauld, 2009).

When central government allocate a budget to DHBs have to accept the political accountability for those funds. As DHBs were unable to transfer resources geographically they searched for other ways to reduce costs. DHBs have been reported to have prioritised resources away from elective services towards acute and emergency services which has meant widespread problems in access for non-urgent medical treatments (Gauld, 2009). Every now and again there have been reports of patients dying whilst awaiting elective surgery for curable conditions. Elliot and Crozier (2008) reported a disappointingly high patient death rate for patients awaiting cardiac surgery at Capital and Coast DHB, the report showed that avoidable delays had led to at least eight people dying without access to treatment.

Because of stories like those seen above it is not surprising that a large number of New Zealand residents purchase private medical insurance to fund elective treatments and avoid public system inadequacies. Because of a long history of poor performance within the public system in the provision of elective surgery the private sector has developed its main capabilities around these sorts of treatments. Unfortunately, this opens up issues of inequality as the hospital care is not available in accordance with need but rather with the ability to pay for treatment, as mentioned in earlier sections of the chapter

3.5.2 Public-Private Interactions in the Market for Hospital Treatments

At the time of the New Zealand Health Survey of 2002/2003 approximately 40% of New Zealanders were covered by private medical insurance (Ministry of Health, 2003). Private medical insurance in New Zealand is designed to wrap around benefits offered by the public system. Insurance cover for hospital services pays for elective services as the bill for acute services is picked up by the taxpayer. Private cover offers prompt access to specialist and hospital services that would otherwise incur long waits in the public system (Blumberg, 2006).

Fougere (2001) argues that the poor performance of publicly funded hospital systems is to blame for the 'exit' of those who can afford to purchase private health insurance. Poor people are less likely to hold private health insurance because they cannot afford it and as a result find themselves on waiting lists for public procedures. In additon to being the least likely to 'exit' the public sector, low income earners tend to be the most medically needy furthering inequalities already evident in the health sector (Besley et al., 1994). In parallel systems such as in New Zealand equity should be considered where the more fortunate can access treatment regardless of clinical need based on individual willingness to pay (Flood et al., 2002). The biggest concern is that healthier people on higher incomes are purchasing private medical insurance as there is significant argument that ownership of insurance increases public spending on health care. However, the industry rejects this and believes that private care offsets public spending and therefore propose universal subsidies for private medical insurance (Blumberg, 2006).

In McLeod et al's (2004) study along with the health of the community, the other major factor driving the demand of publicly funded elective surgery was the proportion of people with private health insurance. The portion of New Zealanders who are covered by private medical insurance has fallen from 50% in 1990 to 40% in 1999 (Howden-Chapman and Ashton,

2000). The reason being that at each insurance policy anniversary the premiums increase and as a result some low risk (mostly younger) customers exit the market. The exit of this particular demographic group within the population leaves a pool of higher risk consumers which results in additional price inflation and further drop-outs by the next anniversary. Also, a large number of insurance policies are subject to exclusions for pre-existing conditions which puts new purchasers of insurance off buying it. New Zealand's largest insurer reported to have 40%-50% of applications for cover subject to exclusions (Blumberg, 2006), therefore lowering the demand for insurance.

The New Zealand health system is based on two tiers where elective surgery is provided by both public and private hospitals. Private hospitals tend to perform mostly elective, non-complex surgery, or the 'lumps and bumps' (Frech and Hopkins, 2004). The prioritisation measures that are applied in the public system are not applied in private hospitals where patients experience dramatically reduced wait time for surgery. Private hospitals initially had a very limited array of services but as waiting lists grew opportunities began to expand and they became able to cater a wide range of services. Fougere (p1241, 2001) states that "…*the disarray in publicly funded health care is expected to result in the 'exit' of those who can afford to leave, inflating the roles of private insurers and underpinning the rapid expansion of private health sector so that it emerges as an alternative rather than just a complement of publicly provided care."* That said, economies of scale prohibit the duplication of high cost care such as acute and trauma care for which the public sector will continue to provide. It is foreseen that the private sector will continue to see expansion in the area of elective surgery (McTurk, 1998).

Private hospitals are advantaged in a sense that they can utilise economies of scale in the specialisation of elective services. Mercer (1998) acknowledges that this is good, so long as private hospitals work on a 'level playing field' with public counterparts. This implies that private hospitals bear the true cost of their work, which does not seem to be the case. Howden-Chapman and Ashton (2000) describe public hospitals as the "provider of last resort" to which private hospitals 'off load' patients to public services when an operation goes wrong, which imposes large costs on the public health system. Another problem is that private hospitals end up performing simple and cheap operations, in effect 'cream-skimming' work that would make public hospitals' work more affordable (Mercer, 1998). These actions mean that indirectly, private sector insurance premiums are being subsidised by an

increasing public health bill met by the taxpayer and therefore reducing resources in the public sector.

Fougere (1974) describes 'exit' as the departure from an organisation or switch to a competing product, in health the decision to use private rather than public facilities in specific circumstances. As well as working to relocate patients into the private sector, exit works to drain the public sector of resources of skilled medical professionals. Demand for the private sector services depends on the dissatisfaction of the public sector. This relationship is true as much for physicians as it is for patients. As a result, public hospitals lose the specialists they are most in the need of because the shortages of resources represent the poor conditions they work in. However, it may be thought that patients exiting the public service may help to alleviate waiting lists; this is not the case as exit works to reduce the number of medical services available to the public sector at a rate greater than it reduces demand. Therefore, public sector performance tends to get worse as a larger amount of exit occurs (Fougere, 1974). Derrett, Bevin, Herbison, & Paul (2009) claim the most significant factor influencing waiting times is supply of physicians.

We know that patients prefer private hospitals on the basis of being ablie to obtain more timely surgery for procedures considered as 'non-urgent' within the public sector as well as the ability to choose their doctor and the high-quality 'hotel' services offered (Vaithianathan, 2002). *"If specialist physicians pace themselves' in the public hospitals, they are more likely to have a greater supply of clients coming to them in their private practices*" (p39, Howden-Chapman and Ashton, 2000). Payment in the private sector is often by FFS and is commonly more profitable for the surgeon than the sessional payments for similar procedures in the public system. As a result surgeons have strong reasons to encourage patients toward private care by maintaining high wait times in the public sector (Duckett, 2005).

Professional ethics are important in determining specialists' integrity. However, operating in a system where the culture of the public system has eroded over time opens up opportunism for misdirected intentions. Many specialists are attracted to income driven incentives in accordance with the higher financial returns for FFS paying private patients even though work in the public sector is reported to be much more interesting clinically. Considerable public concern is generated out of distortions from specialists' split time allocation between public and private employment, the income related inequalities that relate from a parallel

health system and a lack of monitoring of private medical services in New Zealand (Howden-Chapman and Ashton, 2000).

3.5.3 Geographic Inequalities in Access to Publicly Provided Surgery

Derrett et al (2009) found that there are large variations in New Zealander's ability to access a publicly funded operation, depending on which DHB they reside in. A report published in The Press stated that: "*In Canterbury, almost 12 people per 10,000 had private surgery and about 11 per 10,000 had public surgery. On the West Coast, where access to private surgery was more difficult – with only 2.5 people per 10,000 getting a privately funded operation – almost 30 people in every 10,000 got a taxpayer-funded operation" (Thomas, 2009).* Derrett et al (2009) found similar results when they investigated the relationship between publicly and privately provided elective surgery rates for *total joint replacement* (TJR), prostatectomy and cataract surgery during the period 1 July 2000 and 30 June 2005 generated off data sourced from the New Zealand Health Information Service (NZHIS). In this study they found that DHBs with the lowest public provision had the highest private provision. The outcome of Derrett et al's (2009) study has shown that people's ability to access elective services continues to vary according to where people lived or whether people had the disposable income to spend on private surgery. Elective surgery provision remains inequitable geographically despite the goals of equity and fairness promoted with the introduction of the prioritisation system. Derrett, Bevin, Herbison, & Paul (2009) call for more in investigation and discussion of consequences anticipated within New Zealand's two-tiered health system.

The outcomes of the New Zealand hospital sector have been shaped by the decentralisation of hospital management since the introduction of the DHB structure and according to the performance of private medicine. This section has discussed the way that the New Zealand Health and Disability Act (2000) in the establishment of DHBs has created difficulties in the funding of services, particularly in rural areas, and the rationalisation of services that has occurred as a result. Secondly, the private hospital sectors' influence on the public hospital services was examined. Ownership of private health insurance, subsequent use of private hospitals' and physicians incentives to perform surgery in the private sector have been reported to contribute towards inefficiencies in the public health systems capacity to deliver elective surgery.

3.6 Conclusion

New Zealand was one of the first countries to establish a public health system under which the principles of social security guaranteed universal free access to hospitals in accordance with need. This was reinforced through the evolution of the Social Security Act (1938). Since then subsequent governments struggled to control public expenditure in health as a result of an ageing population, scientific and technological advancement in medicine and a growing propensity to consume more care. As a result during the latter part of the twentieth century the New Zealand Government responded by performing a series of repeated hospital restructurings in which market mechanisms and elements of corporatisation were introduced into the health sector in search of efficiency. Methods of rationing were also unsuccessful in controlling a continually rising public health bill.

A series of reforms throughout the 1980s and 1990s has resulted in parallel public/private system in which the private sector performs almost entirely elective surgery, a function which the public system struggles keep up with. Private sector involvement in elective services has been shown to drain the resources out of the public sector and create significant inequalities throughout New Zealand. The provision of elective care has become increasingly significant as the public system struggles to deal with increasing waiting lists as treatments are largely determined on ability to pay rather than according to need.

As a result of growing inequity in the public provision of elective surgery procedures determined by growing waiting lists, a lack of transparency and a lack of certainty whether patients would receive surgery there were calls to introduce a new and improved method of prioritisation to replace the old waiting list system. This led to the introduction of the NZBS in 1998 as the government moved to solve the problems associated with publicly funded hospital provision. Chapter 4 details the establishment of the NZBS, discusses how the system of prioritisation was supposed to function and examines problems that have generated a number of new concerns for the provision of publicly funded elective surgery.

4 The New Zealand Booking System (NZBS)

4.1 Introduction

Waiting lists have been a well-documented method for industrialised governments to ration health services. This form of rationing has, and continues to centre mainly around clinicians determining access for provision of specific services (McLoed et al., 2004). Waiting lists have been particularly common in the provision of elective surgery and have long been seen as an indicator of poor performance within the health sector (Howden-Chapman and Ashton, 2000). Although rationing is necessary in any health system, where scarcity is a factor, it remains essential that government and policy-makers are made to ensure resources are equitably distributed (McLoed et al., 2004).

This chapter outlines the origins of the New Zealand surgical booking system and sets out the process and tools that were aimed at providing a more equitable system for the prioritisation of patients to ensure adequate and equitable provision of elective surgery. Firstly, the chapter will take a snapshot of the booking system and the way it has been set up in order to function effectively. Secondly, literature will be reviewed on the perceived problems associated with the booking and prioritisation system and the unintended consequences for the equity of provision and the generation of inequalities. Some inherent problems with the way surgical outputs are measured and reported to the Ministry of Health (MoH) are discussed. These issues are systemic within the processes and workings of the booking system and are reported to contribute to inequalities in the provision of elective surgery.

4.2 Establishment of The New Zealand Booking System (NZBS)

As waiting lists reached record levels during the late 1980s and early 1990s they acted as a prompt for government to enact the Health and Disability Services Act 1993 (Derrett, 2005). A Green and White Paper proposed the formation of an advisory committee in order to give advice to the Minister of Health to consider any decisions in relation to the allocation of health care resources (Upton, 1991). In response to recommendations in 1992 the Core Services Committee (CSC) was established to undertake public consultation exercises and commissioned a report by Fraser et al (1993) to document the problems associated with waiting lists. Fraser et al (p8, 1993) recommended:

"… the present system of hospital waiting lists be abandoned and replaced by a system of 'booked admissions' for non-urgent surgery and medical and diagnostic procedures. Patients should be assessed by defined criteria, according to their need and likely benefit (worthwhile health outcome) from the procedure. Patients who satisfy the criteria should be offered a date for surgery within a defined period of time. Patients who do not meet the criteria at the time of their specialist assessment should not be registered with the hospital's booking system (or placed on a 'waiting list'), but they should be referred back to their general practitioner for on-going review."

Clinical Priority Assessment Criteria (CPAC) tools were then developed through the consensus of working groups facilitated by the CSC in order to prioritise patients referred for access to high volume, high cost elective procedures (National Advisory Committee on Core Health and Disability Support Services, 1993, Hadorn and Holmes, 1997, National Health Committee, 2002). The main objective of the tools was to establish priority criteria so as to ensure that those in greatest need and potential to benefit are given greater priority in order to make clinical decisions more systematic and transparent (Howden-Chapman and Ashton, 2000, Shipley, 1996).

The longer term goal of CPAC tools was to achieve consistency in assessing and prioritising patients for elective surgery (New Zealand Government, 2000). The booking system also aimed to improve the national consistency of access therefore improve the equity of provision by both improving vertical and horizontal equity (McLoed et al., 2004). That is, those who are high need with greatest ability to benefit were to be treated first while making certain that, regardless of where they live, all New Zealanders have equal access to a wide range of services (Mooney, 1994, Derrett, 2005).

From the hospitals' perspective the booking system would act to control the supply and demand of non-essential surgery (Roake, 2003). The increase in rationing, effected by the new booking system in 1998, signified a revolutionary approach in the eligibility for the treatment of non-essential services. However, Fraser et al's (1993) original report cautioned that when in pursuit of surgery, any scoring system for according priority of access to treatment could be open to abuse by clinicians and patients alike. The report also acknowledged the risk of trouble honouring 'booked' appointments for surgery where resources become inadequate. CPAC tools were initiated largely without trial and were subject to significant issues when they were introduced. Further methods for determining

priority were yet to be developed in full collaboration with clinicians, epidemiologists and the general public on evidence incorporating quality of life data (Gauld and Derrett, 2000).

The NZBS is complicated by a range of terminology and acronyms associated with some important concepts. Figure 9 lists them in the form of a glossary.

Active Review (AR) :Patients that marginally fall short of the aTT that remain under specialist review.

Actual Treatment Threshold (aTT) : The 10th percentile prioritisation score that patients received treatment in the last 12months, also it is the level that each DHB is willing to provide surgery for the following year.

Assessment Criteria for First Specialist Assessment (ACA) : Prioritisation process for referral letters.

Clinical Priority Assessment Criteria (CPAC) :Tools used to prioritise patients for elective surgery procedures.

Clinical Threshold (CLT) : A level of morbidity for which a specialist deems a patient in need of surgery.

Commitment Threshold (CT) : The amount of patients a DHB confirms they will treat in a given period.

Elective Service Flow Indicators (ESPIs) : A series of measures that MoH use to assess the performance of elective service delivery.

First Specialist Assessment (FSA) : Patients first consultation with a specialist.

Financial Threshold (FS) :The lowest prioritisation score that a DHB can afford and is willing to provide surgery.

Residual Waiting List (RWL) : A group of patients that fall between the CLT and the aTT.

Figure 9: Glossary for Terms used in the New Zealand Booking System

4.2.1 CPAC Tools

Figure 10 shown below gives a simplified example of a CPAC tool that specialist consultants can use to prioritise patients in order to make bookings for surgery. The maximum score is divided into twenty points allocated in regards to clinical severity and five points for a patient's ability to benefit. As Figure 10 shows severity and ability to benefit are then further broken down. Severity is broken down into measures of suffering, disability and cost of delay and ability to benefit is broken down into the anticipated degree of patient improvement anticipated and the likelihood of that improvement. The most common method for allocating scores when the system was introduced was by summing scores to a maximum score of 100 points. This meant multiplying the twenty five point score by four (Roake, 2003).

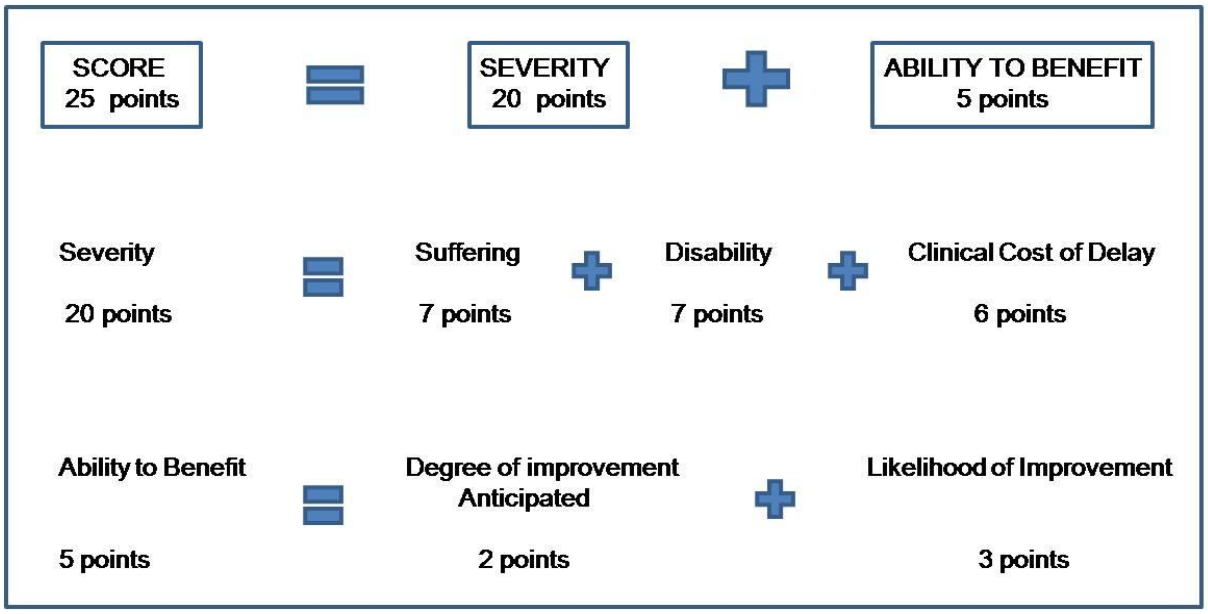


Figure 10: CPAC Example (Roake, 2003)

DHBs are free to modify or adapt CPAC tools as far as they deem necessary. Most CPAC tools are developed in conjunction with clinicians, hospital managers and others (McLoed et al., 2004). CPAC tools have evolved so that most specialties in each DHB have their own points scoring and prioritisation systems (Health Funding Authority, 1998). Some CPAC tools have evolved into simpler forms, such as a five-point scale of urgency assessed by the specialist (Ministry of Health, 2010a). As well as the factors considered in Figure 10 surgeons also prioritise by impact on quality of life, potential for future complications, level of symptoms, co-morbidity, degree of psychological and emotional impact (Roake, 2003). A copy of a complete CPAC scoring sheet for ophthalmology can be found in Appendix 1.

4.2.2 Process of the Booking System

Development of the booking system was initiated by the 'National Waiting Times Project'. The old system of prioritising simply by triage based on urgency was replaced by a dynamic and complex new pathway to elective services. Roake (2003) illustrates the booking process in Figure 11 below.

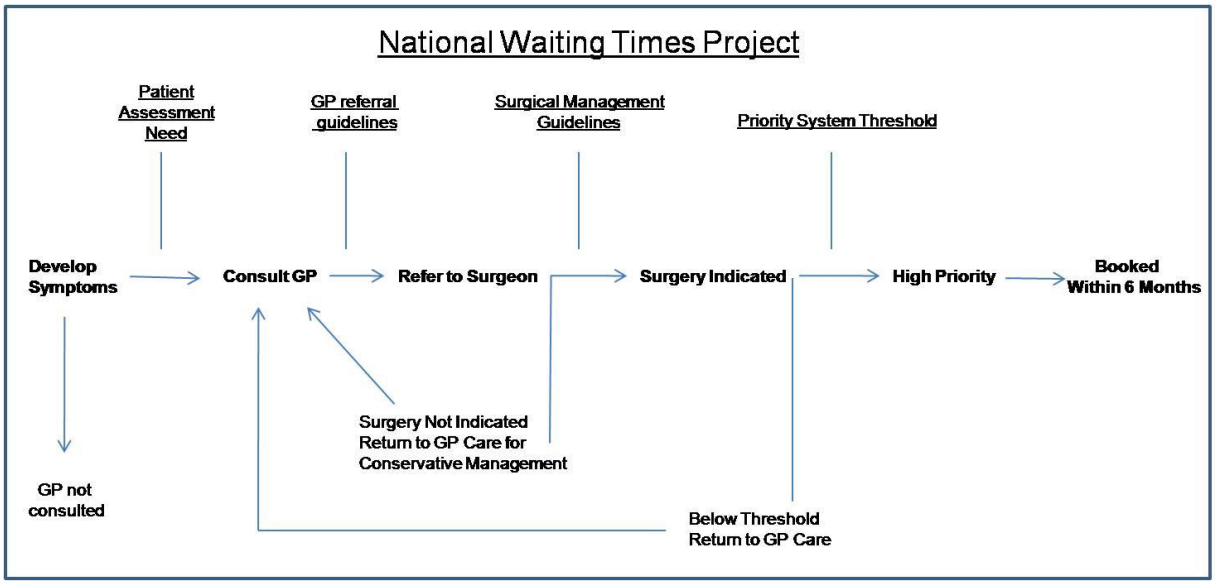


Figure 11: National Waiting Times Project (Roake, 2003)

As shown in Figure 11, the first stage in the process is that an individual may develop symptoms in which case he or she will personally make the choice of whether to consult a GP or not. A doctor may also pick up symptoms during a routine check-up.

Once the patient has entered primary care the GP assesses symptoms and determines the appropriateness of a referral to a specialist. At this stage GPs discuss options of whether a patient may choose to seek treatment through the private system or continue through the public system by way of the booking system. A GP's main role is to guide a patient as to where the patient is going to get the best service (McLeod et al., 2004a). This being so, the symptoms may not meet the criteria to gain treatment through the public system but they may exceed those required to justify a surgical procedure in the private sector. This public/private decision is usually determined on perceived waiting times for public surgery, whether the patient has private medical insurance, disposable income and the patients' willingness to pay for treatment.

In the case that the public system is pursued, the booking system begins with the GP's use of referral guidelines to determine the patient's suitability for onwards treatment. The GP writes a letter of referral to the public outpatient clinic where they are prioritised according to assessment criteria for first specialist assessment (ACA). ACA determines how long it will take to access an appointment with a surgical consultant (Derrett, 2005). This appointment is called the first specialist assessment (FSA). Once the letter of referral has been sent to the

outpatient clinic the DHB is required to appropriately acknowledge and process all patient referrals within ten working days and then ensure FSA is conducted within six months of referral (Ministry of Health, 2010a).

On conducting the FSA the surgical consultant will confirm the patient's diagnosis and consider whether the patient is fit for surgery. CPAC tools are used to determine whether or not the patient will receive surgery and if the patient meets the right criteria, how long they will have to wait for surgery (Derrett, 2005). If the patient falls below the treatment threshold, therefore not meeting the criteria for surgery, the consultant will then refer the patient back to the GP for on-going management unless the condition worsens. Treatment thresholds are discussed below.

It is not until CPAC scoring is complete that patients are either 'booked' or 'not-booked' for a procedure (Derrett, 2005). Once the patient is assessed to be above the treatment threshold the DHB is required to book the surgery within a period of six months (Ministry of Health, 2010a). Those that fail to meet the threshold but who, in their consultant's view, would still benefit from surgery, are recorded on what is called the active review *(AR) list*. These patients remain under the consultant's care in which they return to the outpatient clinic for clinical reassessment at least every six months. In the case that the symptoms of those in AR worsen or the DHB discovers unrealised capacity, a patient may be called up as long as they are fit for surgery. The Ministry of Health assesses DHBs on the performance of the booking system by way of seven elective service flow indicators (ESPIs). These measures, as well as the perceived problems associated with ESPIs, are discussed later on page 82.

4.2.3 Treatment Thresholds

Figure 10 on page 77 depicts the assessment of the surgical consultant via the use of a CPAC tool. As mentioned above, the score generated by this tool is used to prioritise patients. The clinical threshold (CLT) is the number of patients that the specialist considers in need of surgery. Roake (2003) acknowledges evidence that surgeons only allocate a CPAC score if and when surgery is required. Therefore, all patients who are given a CPAC score should be considered as over the CLT for surgery. Within the Booking System DHBs cannot afford to treat everyone above the CLT.

The 'Booked' status of the patient is dependent on the *Treatment Threshold* (TT), also colloquially known as the financial threshold (FS). McLeod et al (2004) states "the financial

threshold is the financially sustainable level of access to elective surgery each hospital is able to offer, within its budget." In order to obtain treatment in a state-funded NZ hospital a patient has to have a CPAC score at or above the actual treatment threshold (aTT). The aTT is the 10th percentile CPAC priority score of patients that received treatment in the previous twelve months (Derrett, 2005). The additional 10% of capacity is reserved for any unexpected management issues affecting the provision of elective surgery and to allow those patients who may need to be allocated a higher priority than their initial CPAC measure indicates (Naden, 2003).

CPAC tools were designed to work in conjunction with the surgical booking system and financial thresholds (McLeod et al., 2004b). Allocation of how much surgery the state will perform is determined by each DHB which is restricted to a capped budget from the Ministry of Health each financial year. As each DHBs health budget is determined on the basis of population, the financial threshold may vary regionally (McLoed et al., 2004). Additional problems occur as DHBs in charge of allocating the health budget have unlimited influence over the money they are allocated and engage in 'volume shifting' in which funding for non-urgent treatments is often shifted to acute or emergency services (Gauld and Derrett, 2000). This reduces capital in elective services and in effect raises the TT.

The commitment threshold (CT) is a score at which DHBs provide further certainty to the patient that they will receive treatment within six months of the patients FSA. In practice a CT should be closely aligned to the previous year's aTT for each DHB. Reports of CTs well above aTTs has been observed in some DHBs which induces patient uncertainty and alleviates DHB pressure for meeting ESPI targets (Naden, 2003).

The explicit nature of rationing is felt by a group of patients who fall between the CLT and the aTT (Roake, 2003). This category of patients who have not accrued enough points to qualify for surgery generate what is commonly known as the residual waiting list (RWL), this subgroup of the community represents an topic of immense public concern as further explained below (Gauld and Derrett, 2000). A system of *active review* (AR) was established in order to meet the demands of those on residual waiting lists, restricted only to patients whom surgery was considered the best option for their care (Ministry of Health, 2010a). However, the AR list only captures a small portion of the RWL, the remainder being those that are returned to their GP for conservative care.

4.2.4 Residual Waiting Lists (RWLs)

The original intention was to clear existing waiting lists so the booking system could be introduced for all new patient assessments. In May 1996 the Bolger National Government earmarked $130 Million to establish the 'Waiting List Fund' that would be used to clear backlogs in the system prior to 1998 when the booking system came online. With the election of a new Coalition Government in December 1996 there was a guarantee of waiting times no longer than 6 months and a promise of an additional $84 Million a year for 3 years for the 'Waiting List Fund' to help achieve government promises.

Government had envisaged that those on existing waiting lists would be reassessed under new prioritisation criteria and either treated or turned away because of ineligibility such that waiting lists for non-urgent surgery would no longer exist (Gauld and Derrett, 2000). In reality the public system was unable to clear the backlogs. Less than half of those who had been on waiting lists had obtained treatment but the remainder were effectively dropped from the secondary health system and referred back to primary care for on-going treatment (Barnett and Barnett, 2003a, Howden-Chapman and Ashton, 2000).

Following the implementation of the booking system on 1 July 1998 few improvements occurred. Patient certainty did not greatly improve and the majority of hospitals failed to give a date for surgery after 10 days post their first specialist assessment. Practical ramifications of the booking system were emerging such as the continuing development and on-going implementation of CPAC tools, which were inconsistent among hospitals and practising physicians (Roake, 2003, Derrett et al., 2003). Furthermore, the funding of public hospitals fluctuated which affected thresholds and ultimately meant inconsistency of treatment for patients of equal need (Gauld and Derrett, 2000).

Because the services provided fall within a capped budget, not all patients can expect to gain access to treatment. In this respect the booking system does not overcome the problems associated with leaving a portion of patients, who are assessed as critically 'in need', untreated (Howden-Chapman and Ashton, 2000). Physicians and patients are put in an impossible situation when all avenues for treatment have been exhausted. Often the only option for the patient is to pay for surgery in the private sector. Because the patient is forced to pay the full cost of treatment through insurance premiums or out of disposable income, these health services are allocated not by way of ability to benefit but in accordance with

ability to pay. It is clear that such 'cost shifting' from hospitals to individuals creates room for inequities to be created (Gauld and Derrett, 2000).

The booking system appealed to politicians as the booking system was designed in such a way that, as the transition to new prioritisation methods reached completion, waiting lists would diminish or opportunely vanish (Howden-Chapman and Ashton, 2000). In reality patients who do not reach the appropriate threshold are not booked for treatment and left to wait in the community until their condition worsens. The evidence is clear that being forced to wait long periods for surgery can have a significant effect on quality of life and there is the real risk that that those on the residual waiting list have become an invisible group in New Zealand Society (Gauld and Derrett, 2000).

4.2.5 Elective Service Patient Flow Indicators (ESPIs)

Each of the 21 DHBs reports to the Ministry of Health on eight elective services patient flow indicators (ESPIs) which are used to measure the performance of elective service delivery. Each of the eight indicators are aligned to a stage as patients move through the elective services booking system and are detailed according to the number of patients that:

- each DHB fails to appropriately acknowledge and process all patient referrals within ten working days
- have waited longer than six months for their FSA
- are waiting without a commitment to treatment whose priorities are higher than the aTT
- are resigned to the residual waiting list (no longer applicable)
- are given a commitment to treatment but not treated within six months
- are in AR but have not received a clinical assessment within the last six months

- have a score above the aTT, but have not received treatment within six months and with respect to those patients placed on AR, have not received a clinical assessment within six months

- were prioritised using nationally recognised processes or tools (Ministry of Health, 2010a).

4.2.6 The Reporting System: ESPIs in the Spotlight

There are several fundamental flaws in the way ESPIs are measured and reported. These are deep seated in the booking system with the effect that those patients within the RWL are hidden and left unreported by ESPIs. As mentioned above, this is because of the way the booking system has been set up to prioritise, and therefore exclude all patients that the DHB does not have the capacity to treat within the next twelve months.

Many of the indicators have become meaningless. The figures reported by DHBs are low and in many cases zero. Indicators were observed over the period March 2009 and February 2010 and ESPIs 1, 4 and 8 and in most DHBs results were either 0% or 100% a ‘squeaky clean’ result. The two most significant indicators are 2 and 5 which measure the percentage of patients in each DHB who have been waiting for more than six months for their FSA or likewise been waiting at least the same period for surgery after being given a CT. The author considers this to be the case because they are the best indicators of waiting time and therefore the most appropriate gauge of public access to elective procedures within the booking system.

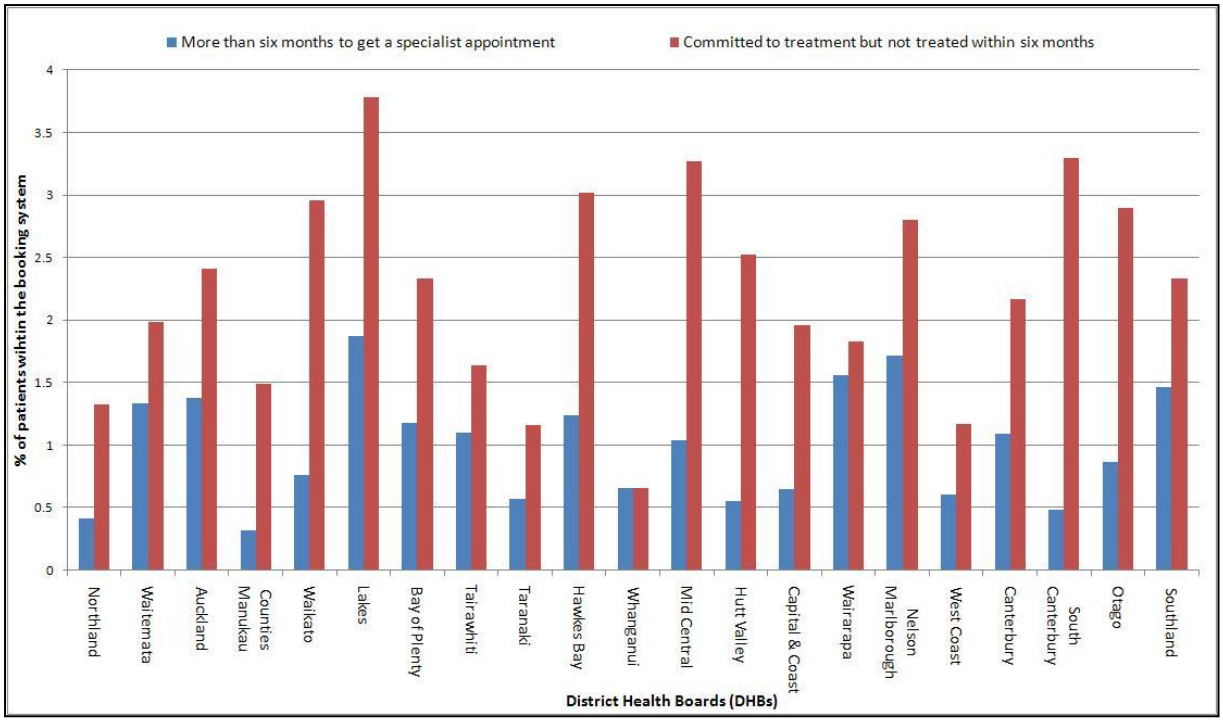


Figure 12: ESPI 2/5 Measuring the Percentage of Patients Waiting Longer than 6 Months for FSA and Surgery: March 2009-February 2010 (Ministry of Health, 2010a).

Figure 12 illustrates the average of monthly ESPI indicators 2 & 5 for each of the 21 DHBs during the period March 2009 to February 2010. In the blue/left bar is ESPI 2, the per cent of patients waiting longer than six months for FSA and in the red/right bar is ESPI 5 which is the percentage of patients waiting longer than six months for their procedure following FSA. While there is marked variation amongst the 21 DHBs, each DHB is meeting its target of less than 2 per cent for ESPI 2 and less than 5 per cent for ESPI 5, set by the MoH. Therefore, as Howden-Chapman & Ashton predicted in (2000), waiting lists are effectively non-existent with all DHBs meeting their objectives set by MoH to measure the performance of the booking system.

The problem with indicator 5 is that it is restricted only to those patients who meet the aTT. In the old system all patients worthy of surgery would have been recorded on waiting lists and now patients assessed as clinically in need of surgery (i.e. above the CLT) who do not meet the financial threshold are sent back to primary care for on-going conservative care. These patients are not recorded in a central database or reported in any form to MoH. Essentially, this group becomes invisible and as a result DHBs appear to be performing extremely well by MoH standards. In an apparent contradiction, waiting lists have been eliminated while many patients are presenting with conditions that warrant surgical

intervention but the waiting are being excluded due to the finite resources in the public hospital system

As a result of new money, specifically targeting electives, that became available under the Labour Government prior to 2008, a new funding scheme was established whereby DHBs incurred financial penalties if they failed to provide surgical services within the six month timeframe. As a consequence of the financial penalties DHBs reacted by 'dumping' patients from their waiting lists and referring them back to primary care. As a result of massive public outcry and a significant input of government funding patients were reinstated onto waiting lists. As a result all DHBs have moved to implement changes to improve the referral process which has the potential to further integrate specialist and primary care (Gauld, 2009).

DHBs have provided in depth guidelines on a wide range of conditions to advise GPs and aid the appropriate referral of patients to acute and elective services. Figure 13 shows the cover of a best-practice guide compiled for GPs by the Canterbury DHB called 'HealthPathways'. These sorts of initiatives have been developed to try and reduce demand and ultimately lower wait time for FSA. This results in fewer people having access to specialist assessment and leaves patients at greater risk from remaining undiagnosed for treatable conditions. However, this sort of strategy can be helpful as communities surgical needs are often masked when public perception of excessive waiting time to gain a FSA. This has a dual effect in that GPs will be less likely to refer patients and patients will be less likely to present in primary care if they know there is an excessive waiting period (Roake, 2003).

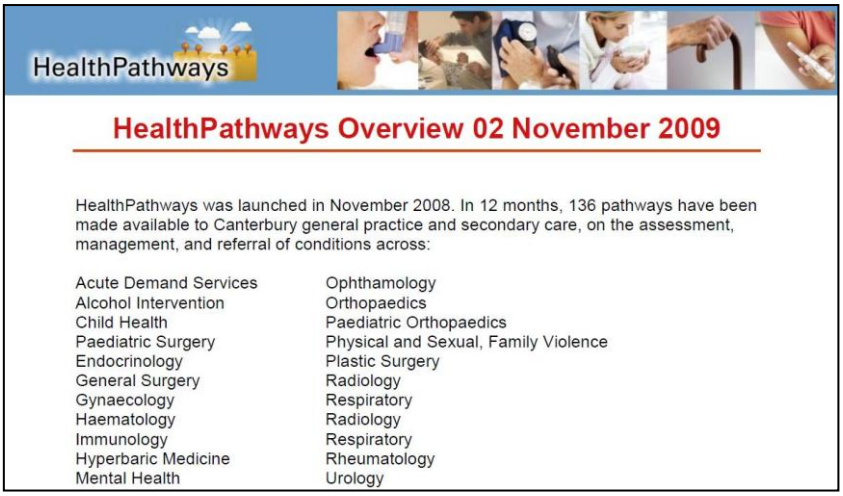


Figure 13: Health Pathways (Canterbury District Health Board, 2009)

4.3 CPAC Tools: From a Clinicians' Perspective

Internationally, literature on the way elective surgery is allocated has focused on equity, waiting times and methods of prioritisation for access. However, in New Zealand recent concerns have centred over the variation in the methods that surgeons have adopted when making priority assessments that determine the fair and equitable access to publicly funded health care (Derrett et al., 2009). McLeod et al (2004) carried out a useful qualitative study which examined GP, registrar and surgeon reflections on the social inequalities generated by the surgical booking system. Several themes emerged as contributing factors towards equity of access for elective services. These included structural barriers and potential for different pathways to care, clinician advocacy, the rationing of public services and varying considerations doctors reserved for the application of CPAC tools.

4.3.1 Primary Care

GPs are often referred to as the 'gatekeepers' of hospital care in New Zealand in that they control the supply of patients flowing through to specialist care and most elective procedures (Fougere, 2001). As mentioned previously, the GP assesses the patient and, if appropriate, sends a letter of referral to the outpatient clinic in which he or she has the chance to advocate for the patient as far as deemed necessary. Unsuitable referrals have the effect of slowing down the booking system so it is important that GPs only refer people most in need of surgery and have a understanding of prioritisation criteria (McLeod et al., 2004a, Ministry of Health, 2010a). Where publicly funded care is not an option, GPs may find other forms of care for their patients or may try different avenues for care outside of the public sector.

For some minor conditions such as varicose veins or hernia, GPs are instructed to not refer patients through to the booking system. Delays in accessing treatment often cause large social and economic costs to individuals and the health system, especially for residents of isolated communities. A GP is quoted in McLeod et al's (p44, 2004) study as saying:

"She's been coming to me for a year ….for pain relief and seeing the district nurse. She's had to have alterations done to her house, she's had to apply for transport,….., and she's a poor Maori, low socio-economic older woman, you know she can't afford to run in and out from the coast…. She's probably got a relative to drive her ….she's cost the system a fortune because of the delay."

For patients like these GPs reported trying to find ways around the public booking system. These have included strategies like determining whether accident-related public insurance would cover such condition or contacting individual surgeons or hospitals for advice (McLoed et al., 2004). In McLeod et al's (2004a) study many GPs commented on the inequalities that resulted from disadvantaged patients not being able to afford private surgery. McLeod et al (2004) also acknowledge that socio-economically disadvantaged people tend to be more likely to move to new locations and therefore, are more likely to be lost to follow up due to the longevity of the booking process.

GPs reported that they advocated for a patient in the referral letter based on their perception of a patients' clinical need and their ability to benefit from publicly funded care. A GP makes a comment on their patients' ability to benefit:

"…a lot of people that are on the waiting list for joints are immobile anyway, not because of their joint but because of their lifestyle, because they are overweight and they've got chronic obstructive lung disease and that sort of thing. I can't see what on earth they are going to get anyway from their operation." (p44, McLoed et al., 2004)

The severity of a patient's condition is also reported to be used for assessment purposes but more notable is the GP's advocacy related to a patient's social circumstances and the consideration of ethnic disparities between Maori and non-Maori. Another comment from a GP shows the extra consideration socio-economic and ethnic factors play when referring patients onwards to FSA:

"…they were all Maoris, low socio-economic…you advocate and go the extra mile for them ….You give them social history,…they're not some white middle class woman with a nanny and a gardener….You let them know that those people are in different circumstances." (p44, McLoed et al., 2004)

When patients are referred back to their GP because they failed to meet the TT for surgery the GP is not informed which components of the priority criteria have prevented their patient from being eligible for surgery. This is to stop clinicians deliberately inflating scores or 'coaching patients' on which symptoms to lie about or exaggerate at further specialist assessment (McLeod et al., 2004a). Similar problems were present in the previous waiting list system where some patients were known to complain loudly, in which case specialists moved those patients up the list effectively jumping the other patients in the queue. This

feature is more commonly known as the 'squeaky wheel' phenomenon (Gauld and Derrett, 2000, Roake, 2003, Howden-Chapman and Ashton, 2000). Priority systems are susceptible to 'gaming'. However, the more transparent processes are, the less gaming that has been shown to occur but full transparency remains a difficulty (Roake, 2003).

4.3.2 Specialist Assessment Criteria for First Specialist Assessment (ACA)

During the FSA, the specialist has the task of prioritising patients by using a single CPAC tool in which he or she will consider the patients clinical need and ability to benefit from surgery. Surgeons accepted the likelihood of clinical disparity between individual assessments:

"I think everyone does it differently and that's another part of the problem. You may get a completely different score depending on who you see and how they perceive your symptoms and how you communicate your symptoms (Registrar)." (p44, McLoed et al., 2004)

According to the Ministry of Health (2010a), booking systems CPAC prioritisation tools are intended to be used at the first specialist assessment. Problems occur when less qualified people undertake such assessments. One surgeon commented in McLeod et al's (2004a) study that his or her secretary occasionally, unofficially fills out the assessment forms. Variations in who does the scoring, whether it be consultants, registrars, nurses or even administrators contributes to variation in CPAC scores (Roake, 2003).

Like GPs, surgeons and registrars think about patients' social circumstances when determining prioritisation for surgery, such as ability to re-enter the workforce and considerations of independence. Socio-demographic and cultural factors are also taken account of. Specialists acknowledged how, in some cultures, it is common that patients will not present to a doctor until the latest possible stage when the symptoms become unbearable and their condition has become severe. Regardless of such examples, when surgeons were asked about equity, most believed that socio-economic status and ethnicity should not play a role in prioritising patients within the booking system. Respondents in McLeod et al.'s (p45, 2004) study were adamant that they did not treat patients differently according to their ethnicity:

"Definitely dispute that. I think that there is no substance in that. For me as a practitioner, as a surgeon, I don't look at what colour they are, where they come from, or what their religion

is. If somebody's got a condition that needs treatment, we give it, and I can vouch for all other surgeons in this hospital, or any other hospital as surgeons (Surgeon)."

Although specialists strongly claimed they did not give special concessions based on ethnicity some suggested different ethnic groups have different preferences for surgery. This may impact on clinician advice and decision-making. One surgeon from McLeod et al.'s (2004) study explained how Maori were less likely to accept surgery and that cultural differences need to be taken into account when considering these patients.

Other surgeons felt that people from different ethnic groups were disadvantaged in that they lacked understanding of the booking system and, as a result, were unable to advocate for themselves or challenge priority decisions. Also, Maori and Pacific people tend to face higher rates of co-morbidity which a specialist from McLeod et al's (p45, 2004) study argued contributes to lack of access for these people:

"…we have what we call co-morbidities…diabetes and obesity. And those problems are probably not distributed evenly amongst the population and it may well be that some of the Polynesian people feel that they are discriminated against on this basis. But that's just purely on medical grounds, it's nothing to do with ethnicity."

Although specialists claim not to give anyone preferential treatment according to ethnicity or socio-economic status it is natural for a doctor to act as a supporter of each patient's needs and interests. Overseas, clinician bias has been shown to be correlated with ethnicity (Smedly et al., 2002, Ayanian et al., 1999), as well as patient influences such as obesity, age and smoking status (Schwartz et al., 2003, Madan et al., 2001, Rohrich et al., 2002). It should be accepted that some relationship between socio-demographic characteristics are evident when considering patients with regard to clinical prioritisation decisions. Within the booking system the advocacy role of clinicians often seems to override acceptance of the public health system's inherent need to ration elective services. One general surgeon acknowledges that:

"The main problem is that surgeons and doctors are patients' advocates and they will try to get their patient through the system…and if they feel the patient needs surgery they will just make up the score." (p97, McLeod et al., 2004a)

This leads us to consider how the specialist might wish to manipulate scoring and whether self-interest is a factor in determining whether the patient is led through public or private avenues for care.

4.3.3 Specialist Manipulation of CPAC tools

Some physicians have stated quite openly they will manipulate the system to ensure that a patient scores sufficient points to reach a threshold level required (Howden-Chapman and Ashton, 2000). One orthopaedic surgeon commented:

"I think if you decide you need to operate on somebody you just simply make the score high enough so they get surgery (p96, McLeod et al., 2004a).

This problem seems to be a hangover from the old triage-based (urgent, semi-urgent and routine) prioritisation that took place prior to 1998. That is, surgeons are making prioritisation decisions instantly by deciding whether the patient needs surgery and then fixing their calculation of the CPAC score to suit. In McLeod et al's (2004b) study 13.5% of surgeons reported that the financial threshold was a major consideration in their generation of CPAC scores. Many surgeons believe that their clinical judgement is the best form of prioritisation and lacked confidence in CPAC tools, labelling such criteria purely as a 'management tool' (McLeod et al., 2004a).

Specialists also have strong perverse incentives via their conflict of interests deriving from the fact that most hold positions in both the public and private sectors. This may contribute to both the generation and sustaining of waiting times and threaten the effectiveness of the booking system (Howden-Chapman and Ashton, 2000). In addition to weakening the performance of the booking system, self-interest can also generate a raft of inequalities. By denying many patients surgery through the public sector, access to elective surgery is further defined by ability to pay through the private sector which tends to exacerbate inequalities as the effects are felt most by ethnic minorities and other deprived communities as examined above.

4.4 Discussion

Beyond issues faced by individual patients and clinicians, it is important that we observe community-wide interactions and take note of inequalities that are generated within the NZBS. Mooney (p101, 1998) observes:

"…the nature of a health care system in a society can convey something more than desire to treat sick people. It is a 'performance indicator' of the concerns for equity and caring in society"

The interactions acknowledged above distinguish concerns of equity in the provision of elective surgery on both a vertical and horizontal basis. In New Zealand, unequal access has been observed in relation to age, ethnicity, cultural differences, socio-economic status, obesity, and financial resources. The NZBS was put in place to improve the transparency and national consistency of access but it seems that the booking process is creating inequalities in access for elective surgery. Derrett et al. (2009) assert that large variations in public provision would not exist if the booking system was working as it should.

Guidelines have been suggested to aid the booking system to eliminate the explicit use of value judgements into clinicians' allocation choices (Giacomini et al., 2001). Guideline recommendations may however be underwritten by value judgements for patient prioritisation that include patients' mental state, behaviour, relationships with other people, financial resources, place in society and environment (McLoed et al., 2004).

McLeod, et al (2004b) found that there was consensus among surgeons that a new nationally consistent method of prioritising patients for access to elective surgery was required. They believed their clinical judgement was the best tool for administering access and felt that further development of surgical scoring tools had the potential to better prioritise patients. Derrett et al (2003) identify the need for instruments capable of prioritising patients across treatment groups. This may solve some consistency related concerns. However, the tighter regulation of CPAC prioritisation tools or a compatible alternative may be the only way to achieve national consistency. Essential for this to occur will be the 'buy in' of GPs, specialists and remainder of the medical community as they will continue to be the agents who apply prioritisation tools for those in need of elective surgery.

A population perspective is necessary to making prioritisation mechanisms work. For a shift to occur for support of a population health focus clinicians need to shift away from individual patient advocacy in which the scores allocated rely purely on CPAC measures. Clinicians should avoid consideration of patients' background (ethnicity, socio-economic status, age, sex,… etc.), financial thresholds, patient demands and personal interests (Hadorn, 2001). This will ensure horizontal and vertical equity are maintained while minimising inequalities as to who gets treated under the publicly funded health system.

4.5 Conclusion

The NZBS was set up in response to public concern over expanding waiting lists and with the aim of creating a more transparent and consistent method for determining access to elective surgery. The convoluted introduction of untested prioritisation criteria from 1998 and the on-going changes and variation of CPAC tools meant that the equity of access for publicly provided elective procedures did not improve.

Waiting lists would inevitably disappear with the reassessment of all patients under the new prioritisation process central to the booking system. Many patients who had previously been on waiting lists for whom surgery was assessed as the best method of treatment were relegated to residual waiting lists and left in the care of their GPs. New patients lacking the appropriate TT scores were likewise referred back to their GPs until a time where their condition worsened.

Waiting times replaced waiting lists in 1998 and as soon as patients had begun being reprioritised using the new CPAC tools and booking process waiting times began to diminish. Soon DHBs were meeting all MoH requirements despite significant unmet demand for elective surgery. Roake (2003) emphasises how waiting times continue to be perceived as a gauge of performance for the Ministry of Health and politicians. However, the length of waiting times has been shown to be a poor measure of community need and health status.

Physician behaviour was reported as contributing to inequalities in the referral of patients to FSA and in the use of CPAC prioritisation tools. GPs were reported to 'coach' patients to exaggerate symptoms in on-going assessment. The specialists' approach was suggested to account for a variation in access to surgery based on ethnicity, age, socio-economic status and other variables by considering these factors during assessment, the failure to use

prioritisation tools correctly, inconsistency of CPAC tools, manipulating scores and engaging in acts of self-interest.

Issues of equity have been widely reported throughout the literature and it is evident that this variation in access is partly determined by the variation of CPAC tools. Achieving greater consistency of access is determined by universal prioritisation criteria and by having clinicians focusing less on their patient advocacy role and giving greater consideration to their role within the booking process would be to the greater good of the public health service.

5 Methodology

5.1 Introduction

The previous chapter discussed the development of prioritisation criteria for the provision of elective surgery in New Zealand. That concludes the literature review section and we will return to the three objectives that this project is setting out to achieve. The first is to examine geographic differences in patients' access to elective surgery through the NZBS. The second is to observe individual factors, such that certain groups may experience different waiting times within the booking system. The third objective includes a contextual measure, the importance of the private hospital sector, in order to determine the extent to which this has influenced public surgical waiting times. Objectives 1-3 align with chapters 6 to 8, each chapter producing results in order to satisfy an objective. Chapter 9 discusses the results, the dissemination of interview transcripts and draws some conclusions.

This chapter (5) is divided into five sections. Firstly the objectives are discussed in conjunction with the structure of the following proceeding chapters. Data collection, description and data processing are discussed in the second section of the chapter. Thirdly, methods of statistical analysis are considered according to each dataset. The fourth section provides a short summary of how Geographic Information Systems (GIS) were incorporated to allow a clear presentation of results and also details the interviews that were undertaken with a group of medical specialists and hospital managers. Finally, limitations that were experienced during analysis sections will be reported.

5.2 Structure for Results and Discussion

This chapter introduces the analysis that will take place to achieve the results in the following chapters of this thesis so it is important that the objectives are revisited before proceeding further. These are:

- To observe the performance of the NZBS and to assess how the length of waiting times varies geographically.

- To investigate how public surgical waiting times vary between different sub groups of New Zealand's population

- To examine contextual factors, specifically whether the provision of privately funded elective surgery is affecting public surgical waiting times.

Figure 14 lays out the structure for the remainder of this thesis. Chapters 6, 7, and 8 are the results chapters, each of which focuses on one of the three objectives described above. Chapter 9 of the thesis is reserved for the discussion, interpretation of the results and the drawing of conclusions. Figure 14 also summarises the purpose and key themes for analysis that will be discussed within each chapter. Objective 1 is studied in Chapter 6, the purpose being to examine national and international variation in waiting times in elective treatments for New Zealand and Australia. Chapter 7 will examine objective 2 by observing social and demographic inequalities that affect patients' access to care within the NZBS, these will include age, gender, ethnicity and measures of individual deprivation. Chapter 8 will incorporate analysis for objective 3 relating to the contextual factors involved when determining geographic differences in waiting times. Firstly, waiting times will be controlled for urban-rural influence and by measuring the effect of the private hospital sector on public waiting lists. Chapter 9 will be used to discuss results found in Chapters 6, 7 and 8 and to interpret interviews that were conducted with medical specialists and hospital managers working in the field before taking the to draw any conclusions.

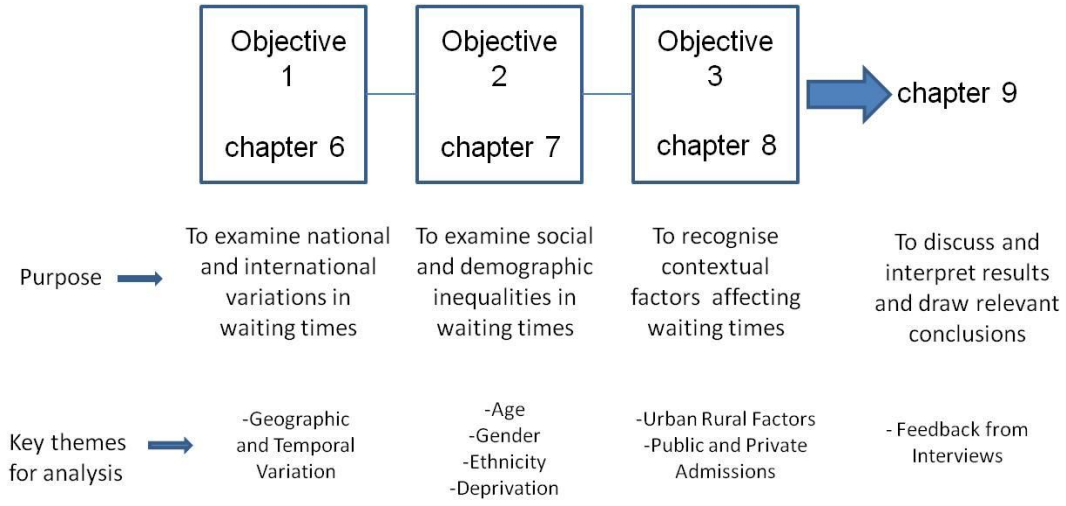


Figure 14: Chapter Outline

Scale of Research

The scale of research undertaken for objectives 1, 2 and 3 will focus on national level analysis broken down in most cases by DHB to consider how each health authority is performing in relation to others throughout the country. This will include results from analysis conducted in Chapters 6, 7 and 8. Figure 60 (Appendix 2) shows the geographic distribution of District Health Boards that were providing health and disability services during the study period (2004-2007). The only exception is the inclusion of Australian data that has been produced as a result of a study undertaken by the *Australian Medical Association* (AMA) (AMA, 2009). Figure 61 (Appendix 2) depicts Australia's states and territories that are relevant to analysis within Chapter 6.

5.3 Data Collection

Data was collected from three major sources. These were:

- the New Zealand Ministry of Health (MoH), National Health and Information Service (NZHIS)
- the Australian Medical Association, Public Hospital Report Card
- Statistics New Zealand, the 2006 New Zealand Census.

As shown in Figure 15 each of the sources provided data for analysis and final results for this thesis. The blue circles indicate statistical analysis as well as geo-coding for final presentation of results and the boxes show datasets from each of the sources listed above. These datasets were used across the three objectives. Objective 1, which looks at geographic differences in waiting times, used the MoH's National Booking and Reporting System (NBRS) dataset in combination with the Australian Medical Association's Public Hospital Report Card to generate results on average waiting times for New Zealand and Australia between 2004 and 2007. Objective 2, which aims to examine individual determinants for waiting times, uses a combination of NBRS and New Zealand Census (2006) data to generate results applying to New Zealand. Objective 3, which sets out to see how the private hospital sector influences public waiting times, uses a combination of National Minimum Dataset (NMDS) records which reports hospital admissions in the public and private sectors, the NBRS dataset and the New Zealand Census (2006) to relate

hospital admissions data to waiting times. The information request for the New Zealand datasets from the NZHIS division of the Ministry of Health is now discussed.

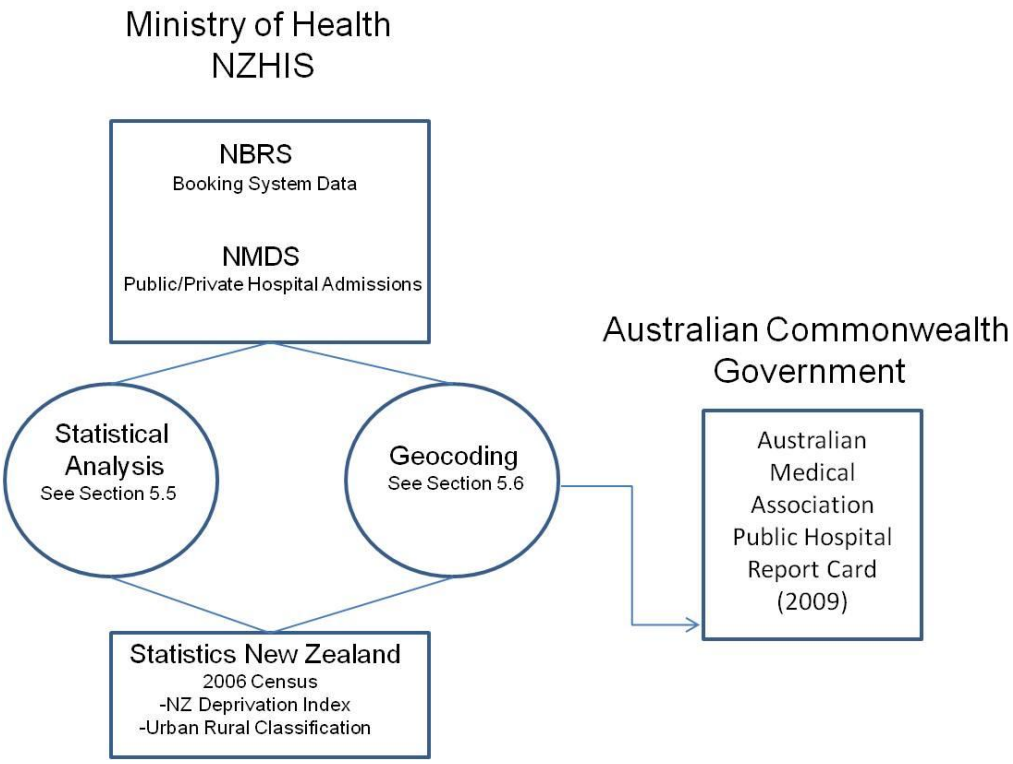


Figure 15: Data Collection and Analysis

5.3.1 Obtaining Data

An application was made to NZHIS in August 2010 to obtain the complete dataset of the National Booking and Reporting System (NBRS) and National Minimum Dataset (NMDS) for the period 2004-2007. The MOH's mandate to collect health information is set out in New Zealand legislation, in particular Section 22 of the Health Act 1956, Section 139 of the Hospitals Act 1957 and the Cancer Registry Act 1993. The collection, storage and use of this information is also governed by the Privacy Act 1993, the Health Information Privacy Code 1994, and the Accident Insurance Act 1998. NZHIS currently manages the national health information systems and standards on behalf of the Crown. As a collector of information the NZHIS has several statutory obligations:

- the need to protect patient confidentiality and privacy

- the need for connectivity between health information systems to promote communication and integrity
- the need for standard data definitions, classifications and coding systems
- the need to collect data once, as close to the source as possible and may use it as many times as required to meet different information requirements
- the requirement for national health data to include only that data which is used, valued and validated at the local level
- the need to address Maori issues.

All health and disability service providers, agencies and organisations, as defined in the Health Information Privacy Code 1994, with access to national data are required to adhere to and comply with the national information standards, definitions and guidelines. These include the maintaining the integrity and security of the databases and the transmission or exchange of data only essential data between health and disability service organisations. Therefore, most of the data is coded in such a way that individual identity is not revealed but the data does give demographic and geographic information about patients and their relevant backgrounds. The datasets that were obtained are further discussed below.

National Booking Reporting System (NBRS)

The NBRS dataset contains information on the NZBS that is used to prioritise patients for publicly funded elective surgery as detailed throughout the previous chapter. The MOH has required each DHB to send monthly reports of each patients status within the booking system since 1 August 2001. Information is collected about the patient's date of entry into the system, their assessed priority, and their booking status. Information is also collected relevant to the:

- specialty and procedure
- age of patient at time of referral
- gender of the patient
- ethnic group of which each patient belongs
- the DHB the patient normally resides in and the DHB the operation was performed in
- each patient's domicile code
- the particular hospital where the operation was performed

- each patient's Clinical Priority Assessment Criteria (CPAC) score and scoring tool used
- date of referral
- date of First Specialist Assessment (FSA)
- days since last review for those patients places on AR
- date surgery was performed.

Unfortunately, some variables are incomplete which places some limitations on this study. For example, there is a significant amount of referral dates missing from the NBRS which limits analysis of patients' waiting times for FSA.

Elective Service Patient Flow Indicator's (ESPIs) Reported Within the NBRS Dataset

As mentioned in Chapter 4 most of the ESPIs are no longer relevant. The only two worthy of mention are ESPI 2 (patients waiting longer than 6 months for their FSA) and ESPI 5 (patients given a commitment to treatment but not treated within 6 months). Unfortunately, many of the referral dates have not been recorded which has meant the dataset is unable to provide a reliable measure for ESPI 2. Analysis of ESPI 5 is possible but may not provide a true indication of who is receiving the best access to treatment. This is illustrated in Figure 16 which shows the process involved in being referred for prioritisation and then onto treatment.

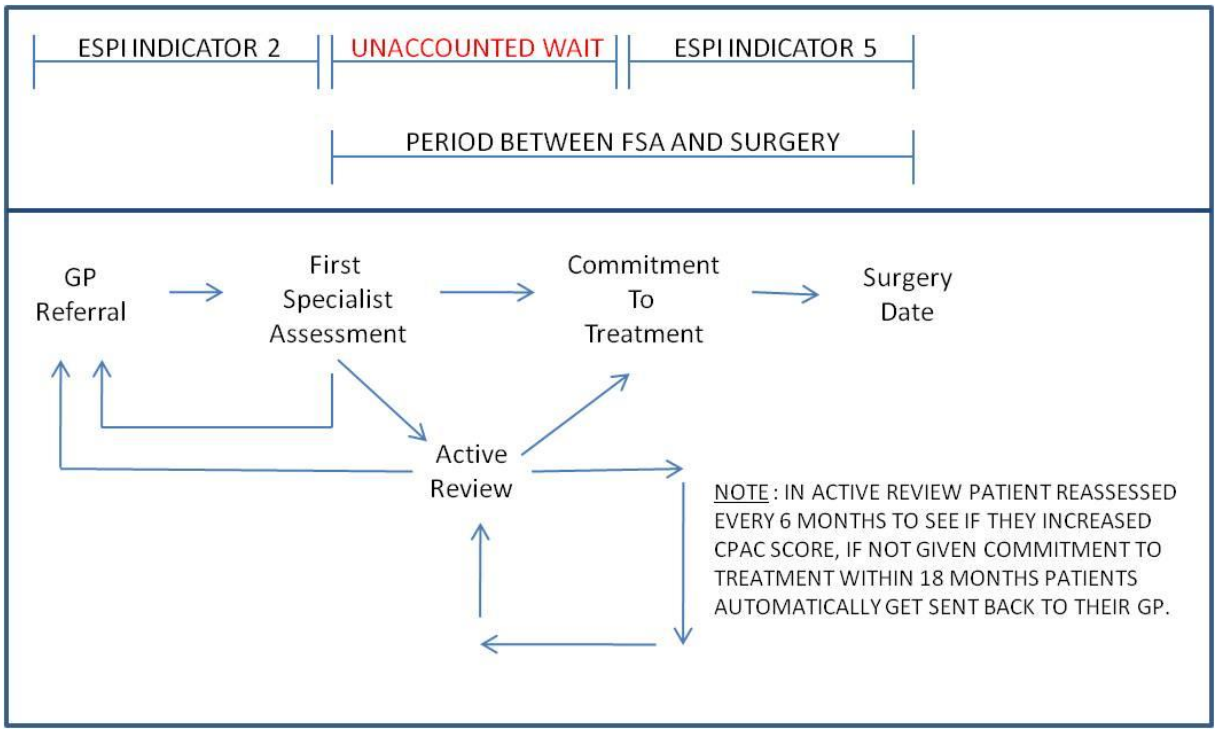


Figure 16: Route to Surgery

A problem arises when patients are not given an immediate commitment to treatment during their FSA. The DHB will only commit to the treatment of a patient at a time when they have the funds to meet the financial cost of providing surgery. This may mean patients have subsequent assessments in which under the process of AR, their condition may eventually be deemed to have deteriorated enough to meet the required CPAC score and gain a commitment to treatment, but for the purposes of ESPI 5 this is not considered waiting time. Therefore, to obtain a true measure of waiting time the author took the period between FSA and surgery date and all ESPI measures were disregarded. As seen in Table 2 the period measured for this research includes the wait time from FSA until the patient is given a commitment to treatment right up to the day of surgery. As can be seen below in Table 2, the difference between the ESPI measure and the true wait time from FSA to surgery date is quite substantial.

District Health Board	*Period between Commitment to Treatment and Surgery Date*	*Period between FSA and Surgery*	*Difference*
Northland	68 days	169 days	101
Waitemata	85 days	120 days	35
Auckland	82 days	132 days	50
Counties Manukau	48 days	126 days	78
Waikato	56 days	142 days	86
Lakes	90 days	147 days	57
Bay of Plenty	60 days	137 days	77
Tairawhiti	111 days	156 days	45
Taranaki	72 days	114 days	42
Hawke's Bay	104 days	164 days	60
Whanganui	78 days	109 days	31
Mid Central	89 days	147 days	58
Hutt Valley	113 days	162 days	49
Capital and Coast	115 days	169 days	54
Wairarapa	94 days	123 days	29
Nelson Marlborough	75 days	170 days	95
West Coast	121 days	171 days	50
Canterbury	72 days	197 days	125
South Canterbury	101 days	152 days	51
Otago	107 days	145 days	38
Southland	54 days	180 days	126

Table 2: Difference between FSA and CT 2004-2007 (Mean score per DHB)

National Minimum Dataset (Hospital Events) (NMDS)

The NMDS is a national collection of public and private hospital discharge information, including clinical information, for inpatients and day patients. The NMDS is used by the Ministry of Health, DHBs, PHOs, clinicians, researchers and members of the public for statistical information, clinical benchmarking, and planning and funding. The NMDS is used for policy formation, performance monitoring, research and review. It provides statistical information, reports, and analyses about the trends in the delivery of hospital inpatient and day patient health services both nationally and on a provider basis. It is also used for funding purposes. All records must have a valid National Health Index (NHI) number. Data has been submitted electronically in an agreed format by public hospitals since 1993. The private hospital discharge information for publicly funded events, e.g., birth events and geriatric care, has been collected since 1997 (Ministry of Health, 2010b).

Information is collected on all hospital discharge events and lists a number of useful facts including:

- specialty and procedure
- operation date
- length of stay
- gender of the patient
- ethnic group of which each patient belongs
- the DHB the patient normally resides in and the DHB the operation was performed in
- each patient's domicile code
- the particular hospital where the operation was performed
- New Zealand residency.

2009 Australian Public Hospital Report Card

The 2009 Australian Public Hospital Report Card was located on the internet and gave all the median waiting times and the percentage of patients that were treated within 90 days for each Australian state and territory over the years 2004-2007 (AMA, 2009). This provided a useful comparison between the New Zealand and Australian public hospital systems.

The Australian results produced by the AMA are based on what the Australian Health System defines as 'category 2 elective surgery patients' which encompasses all elective surgery patients who suffer some pain, dysfunction or disability that is unlikely to deteriorate quickly or become an emergency. Category 2 patients represent over 35% of elective surgery admissions nationally (AMA, 2009). The Australian Commonwealth Government recommends that patients with such conditions receive treatment within 90 days of specialist consultation (Australian equivalent to FSA). The definition of 'category 2' elective surgery patients closely aligns with the low to medium urgency elective interventions in New Zealand, therefore it seems a useful and relevant comparison. However, it must be acknowledged that Australia and New Zealand have different systems and procedures in dealing with elective treatments.

Statistics New Zealand 2006 Census Dataset

New Zealand Deprivation Index

The New Zealand Deprivation Index (NZ Dep) 2006 is a composite index of social and material deprivation derived by principle component analysis. Calculated at Meshblock level NZ Dep2006 can then be aggregated into larger units. Meshblocks are geographical units defined by Statistics New Zealand, containing a median of approximately 87 people in 2006. The score is scaled to give a New Zealand average of 1000, with a standard deviation of 100 index points. NZ Dep uses deciles (tenths of the population), where 1 represents the least deprived area and 10 reflects those areas that are most deprived (Salmond et al., 2007). For the purposes of most of the analysis NZ Dep 2006 deciles were converted into quintiles 1-5 by grouping deciles 1 & 2, 3 & 4, 5 & 6, 7 & 8 and 9 &10. NZ Dep2006 is an updated version of the NZ Dep91, NZ Dep96 and NZ Dep2001 indices of socio-economic deprivation. NZ Dep2006 combines nine variables from the 2006 national census which reflect eight dimensions of deprivation. The variables for NZ Dep2006 are described in Table 3.

Dimension of deprivation	Variable description (in order of decreasing weight)
Income	People aged 18-64 receiving a means tested benefit
Income	People living in households with income below an income threshold
Owned home	People not living in their own home
Support	People aged <65 living in a single parent family
Employment	People aged 18-64 unemployed
Qualifications	People aged 18-64 without any qualifications
Living Space	People living in households below a bedroom occupancy threshold
Communication	People with no access to a telephone
Transport	People with no access to a car

Table 3: Variables that are Used to Produce NZ Dep2006 (Salmond et al., 2007)

Urban-Rural Classification Dataset

The Urban Rural Classification dataset was originally produced with the results of the 2001 Census specifically for a report to provide a snapshot of differences that people face depending on whether they live in an urban or rural environment. The 2001 Urban Rural Classification explored the diversity of the social and economic characteristics of people living in all areas of the urban-rural spectrum; from the heart of Auckland, our largest city, to the remote areas of the South Island's West Coast. The project-specific classification

developed for this report re-categorised rural areas on the basis of the significance of urban areas as a source of employment. Smaller urban areas are re-categorised according to the proportion of people that work in a main urban area. The Report: “New Zealand: An Urban/Rural Profile” is based on statistics from Statistics New Zealand and other government agencies, including the 2001, 1996 and 1991 censuses of Population and Dwellings, the New Zealand Income Survey, and the Land Transport Safety Report (Statistics NZ, 2001b).

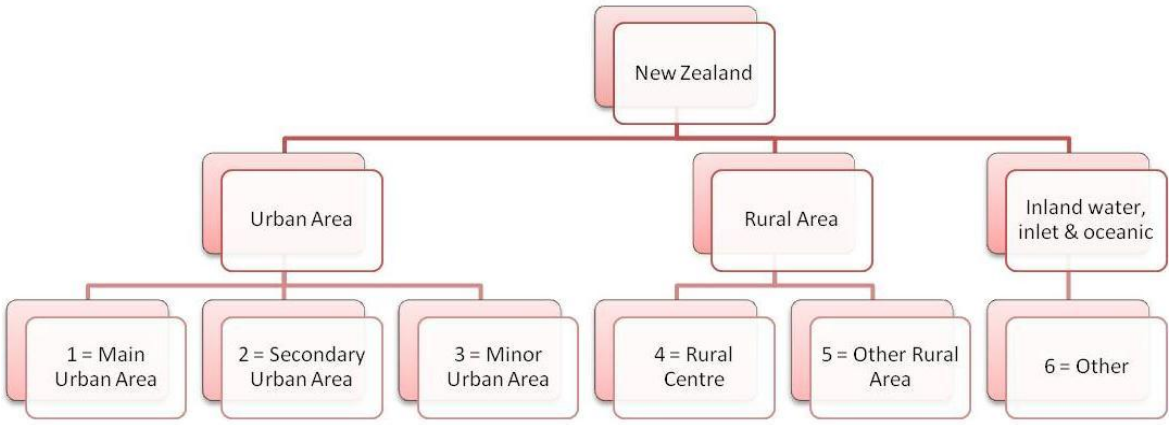


Figure 17: Urban Rural Classification (Statistics New Zealand, 2010)

The Urban Rural Classification was fundamentally changed following the census in 2006. The new version of the classification does not seem to address rural zones of urban influence as under the old classification. The updated version included six classifications at displayed in Figure 17, and they are defined as follows:

- Main Urban Area = “Main urban areas are very large urban areas centred on a city or major urban centre. Main urban areas have a minimum population of 30,000”.

- Secondary Urban Area = “Secondary urban areas were established at the 1981 Census of Population and Dwellings. They have a population between 10,000 and 29,999 and are centred on the larger regional centres”.

- Minor Urban Area = “Minor urban areas are urbanised settlements (outside main and secondary urban areas), centred around smaller towns with a population between

1,000 and 9,999. This complies with international definitions of 'urban' population, which include towns with over 1,000 people".

- Rural Centre = "Rural centres were established during the 1989 review of geo-statistical boundaries. Rural centres have no administrative or legal status but are statistical units defined by complete area units. They have a population between 300 and 999. These are not termed 'urban' under standard international definitions, but identifying these settlements enables users to distinguish between rural dwellers living in true rural areas and those living in rural settlements or townships"(Statistics NZ, 2010a).

- Other Rural = All rural locations that do not satisfy the definition of a 'rural centre', therefore live in a location with a population of less than 300.

- Other (inland, inlet, oceanic) = Areas outside the Urban-Rural Profile, "There are 683 meshblocks in this category, altogether comprising 1.7 per cent of total meshblocks in New Zealand" (Statistics NZ, 2010b).

To get an understanding of the variation in waiting times experience between urban and rural residents domicile code was linked to their urban-rural classification and a code was assigned equivalent to the level of urban amenities available in their particular area of origin. Each patient within in the NBRS dataset has been allocated a urban-rural profile classification according to his or her home address. Since the data had been produced at meshblock level by Statistics New Zealand it was necessary to aggregate it up to census area unit level to attach the Urban Rural Classification codes to the NBRS dataset.

5.3.2 Data Sorting

In order to be able to analyse the datasets that were presented, data needed to be organised in such a way that it would produce results and satisfy each of the three objectives. Narrowing some of the datasets it helped support the specific analysis and eliminated some of the bias. For example, when ACC funded operations were included, the waiting times data was being distorted by many patients who were gaining publicly funded operations through the private sector. Figure 18 gives an overview of the steps that were taken to refine the datasets, create new variables and some basic tools used for analysis.

The left hand side of the flow chart shows stars to indicate which datasets each process applied to.

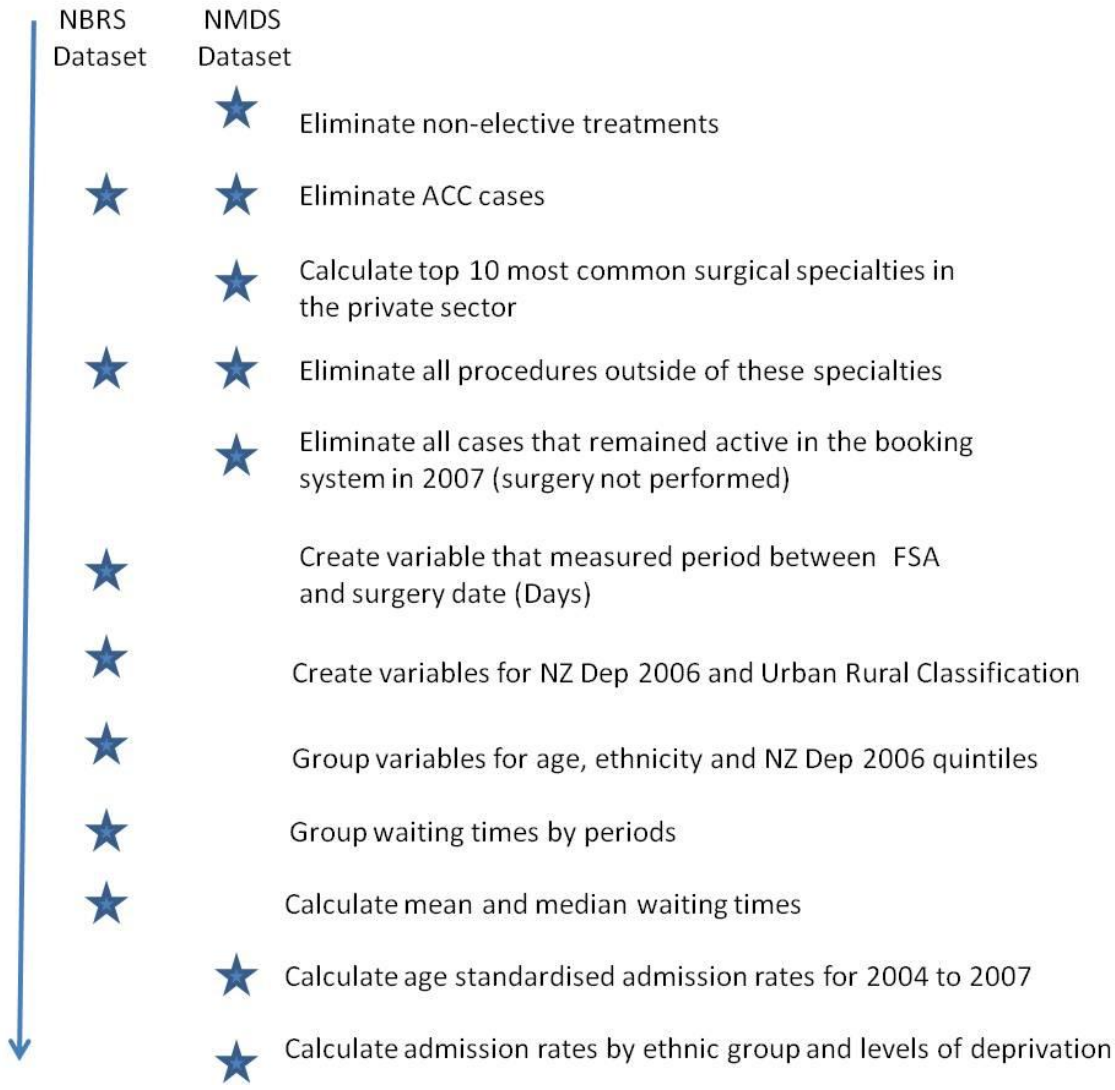


Figure 18: Data Sorting

The first major task was to narrow down the national dataset to the information that was required for the purposes of meeting each objective. Since the study is limited to elective surgery provision the author began by looking at the NMDS dataset and eliminating all non-elective treatments that were completed during the years 2004-2007.

Attention then focused on the private hospital section of the NMDS dataset. As objective 3 aims to examine how private sector admissions have affected the provision of publicly funded surgery the author wanted to focus on surgical procedures that are most commonly

performed by the private hospital sector. The 10 most common surgical procedures were found and it was discovered that many of the treatments were grouped into broad types of surgery, (Table 4). The fact that specific surgery types were unable to be obtained and because the top 10 procedures only amounted to 36% of total private hospital admissions meant that to get a true representation of private sector influence, a wider range of treatments would have to be included in the study. For this reason the author chose to calculate the top 10 surgical specialties in the private sector as illustrated within Table 5.

Number	Procedure	Per cent of Cases
1	Other aftercare W/O catastrophic or severe CC	7.5
2	Lens procedures same day	4
3	Tonsillectomy and/or adenoidectomy	3.7
4	Dental extractions and restorations	3.4
5	Myringotomy W tube insertion	3.3
6	Other skin subcutaneous tissue and breast procedures	2.9
7	Inguinal and femoral hernia procedures age >0	2.9
8	Other colonoscopy same day	2.9
9	Other knee procedures	2.8
10	Follow up W endoscopy	2.7
Total		36.1

Table 4: The Ten Most Common Surgical Procedures in the Private Sector 2004-2007.

Table 5 displays the top ten surgical specialties which are far easier to specify. Also, the top ten specialties represent almost 98% of the NMDS (Private Hospital) dataset which provides a far better representation of the private sector's deployment of resources. However, the author wished to disregard all private sector treatment associated with maintenance of the elderly which has become a large function of the private hospital sector in New Zealand. In order to do this general medicine was eliminated from the analysis. The eleventh surgical specialty, Gastroenterological surgery was included in the place of general medicine, shown in Table 6.

Number	Specialty	Per cent of Cases
1	General surgery	65.3
2	General medicine	23.3
3	Orthopaedic surgery	2.0
4	Gynaecology	1.8
5	Otorhinolaryngology (ENT)	1.6
6	Ophthalmology	1.2
7	Plastic surgery [excluding burns]	.8
8	Cardiology	.7
9	Gastroenterology	.7
10	Urology	.4
Total		97.7

Table 5: The Ten Most Common Surgical Specialties in the Private Sector 2004-2007

From here all cases other than those which fall within the ten chosen specialties were removed from the NMDS and NBRS datasets. This allowed further analysis by specialty and meant it was possible to concentrate on specialties where the private sector has a significant influence in the provision of publicly funded surgery and, therefore, influence over the NZBS. The author could now concentrate on arranging individual datasets for analysis.

Number	Specialty	Per cent of Cases
1	General surgery	65.3
2	Orthopaedic surgery	2.0
3	Gynaecology	1.8
4	Otorhinolaryngology (ENT)	1.6
5	Ophthalmology	1.2
6	Plastic surgery (Excluding Burns)	.8
7	Cardiology	.7
8	Gastroenterology	.7
9	Gastroenterological surgery	.2
10	Urology	.4
Total		74.5

Table 6: Specialties Chosen For Study

Data Sorting (NBRS data)

There was now referral and surgery data for every patient that was entered into the NZBS for the top ten specialties from 2004 to 2007. The next thing was to delete all cases except

those which had actually received treatment during 2004-2007. This eliminated duplicate booking events in the system. Also, all cases that were still in the system at the end of 2007 would be retained. However, limited analysis took place on this subset of the data. Table 7 summarises the booking status of all cases in the NBRS following these selections.

Booking Status	Cases
Cases of Completed Surgery by the end of 2007	563 665
Cases Booked for Treatment at the end of 2007	5 318
Cases Given Certainty at the end of 2007	29 980
Cases in AR at the end of 2007	8 750
Cases Deferred at the end of 2007	3 284
Cases Rebooked at the end of 2007	428
Total Cases in the NBRS (2004-2007)	611 425

Table 7: Booking Status of Cases in the NBRS 2004 to 2007

Creating a new variable: FSA to Surgery Date

After establishing which cases would be used from the NBRS dataset, the next task was to create a new variable which would measure the waiting time from FSA to Surgery date. SPSS software contains a date/time wizard to calculate the difference between two dates to create a new variable using days as the unit of measurement. This was applied to all cases of completed surgery to give the principle variable for analysis.

Grouping Data

Because of the large variation in waiting times from several days through to a matter of several years it was important to decide on periods that were relevant to the study. Because the MOH requires patients to be treated within 6 months of having being given a commitment to treatment it was considered that periods should loosely be aligned to ESPI 5, although it must be noted this is not the same measure. The periods of waiting that were assigned to cases are indicated in Table 8. This table gives an indication of the spread of waiting times in the dataset (between 2004-2007).

Waiting Period	Number of Cases	Percentage of Cases
Not Yet Processed	47 814	7.8
0-90 days	314 987	51.5
91-183 days	112 053	18.3
184-275 days	55 072	9.0
276-365 days	26 864	4.4
366-548 days	26 774	4.4
549-730 days	12 034	2.0
731 days +	15 827	2.6
Total	611 425	100.0

Table 8: Waiting Periods between FSA and Surgery for All Cases

Ages and ethnicity were also grouped to allow further statistical analysis of the dataset. Ages were grouped as follows:

- 0-14 years
- 15-24 years
- 25-44 years
- 45-64 years
- 65-74 years
- 75 years plus.

Because the dataset specified 26 different ethnic group codes it was necessary to group these into categories. The four most common ethnic groups in New Zealand provide useful analysis in Chapter 7. Ethnicity was grouped as follows:

- European descent
- Maori descent
- Pacific descent
- Asian descent
- Other, not specified.

Importing new variables

Because the domicile code is present for each patient within the booking system in the dataset the domicile code was able to be linked to NZ Dep 2006 at census area unit level. The New Zealand deprivation scores for 2006 were created for all cases to get an indication of patients' socio-economic backgrounds. Unfortunately, NZ Dep 2006 does not account for longitudinal change but since the scores were taken during the middle of our study period they should give a reasonable indication of deprivation for each case. Deprivation scores were linked to all cases according to the patients' domicile code listing in the census area of residence. The New Zealand Urban Rural Classification was also attached to the NBRS (SPSS) file using the same methods.

Defining District Health Boards in the NBRS

In the booking system patients often travel for operations outside of their home DHB. For example patients travel from the West Coast DHB for joint replacement treatment at Christchurch Hospital because of a lack of services on the West Coast. Where patients are coded for operations that are performed by a public provider outside their DHB they are considered a patient of the other DHB. In this case the DHB where the patient resides transfers the funding to the outside DHB to perform the operation using a standard cost schedule (per operation). Between 2004 and 2007, 766 patients throughout the country travelled outside their DHB for treatment, this represents just over 1% of the 563 665 patients treated within this period. There is a field which links the patients' domicile code or home location and links each of the 21 DHBs. By using this code the author has ensured that each patient record has been correctly coded according to their DHB of residence.

5.4 Statistical Analysis

5.4.1 NBRS Analysis

Mean and Median waiting times per DHB

In SPSS, the final NBRS data was split into 21 DHB files. Mean and median waiting times were measured for each DHB over the years 2004-2007 to understand the average length of wait between FSA and treatment. This would establish geographic and temporal differences between regions in the performance of individual DHBs in providing prompt elective surgery

treatments according to patients' DHB of residence. The mean of the four years encapsulated by the study period were calculated and results are shown by DHB.

Patients Waiting More Than 6 months and 12 months for Treatment

For each DHB the waiting time data was sorted according to three time periods; less than 6 months, less than 12 months and patents waiting over 12 months for treatment. The number of patients in each group over the years 2004-2007 were calculated in each SPSS NBRS DHB file and then pasted into Microsoft Excel for analysis. Percentages were taken for each DHB each year over the period 2004-2007 according to the number of patients waiting more than 6 months and more than 12 months for treatment. The mean of both 6 and 12 month waits were calculated between the four year period of the study and results are shown by DHB.

Australasian Comparison of Median Waiting Times

Median waiting times for the four years 2004-2007, and four year averages were reproduced from the NBRS dataset and the 2009 AMA report on Public Hospitals. By combining the datasets comparisons are able to be made between New Zealand (DHBs) and Australia (states and territories).

Australasian Comparison of Percentage of Patients Being Treated Within 90 Days

The author took the Australian Commonwealth Government's recommended standard of patients to be treated within 90 days and applied it to the New Zealand NBRS Dataset. Instead of taking 6 or 12 months, the author worked out all patients that were processed within 90 days and those of treated persons who fell outside this threshold. Results for the four years 2004-2007, and four year averages were produced from the NBRS dataset and copied from the 2009 AMA report on Public Hospitals. By combining the datasets comparisons are able to be made between New Zealand (DHBs) and Australia (States and territories).

Median Wait Times for New Zealand Broken Down by Surgical Specialty

Examining wait times in New Zealand across our chosen ten surgical specialties meant breaking down the dataset another level. The author split the NBRS file according to the top

five specialties that are found within Table 6, these are general surgery, orthopaedic surgery, gynaecology, otorhinolaryngology (ENT) and ophthalmology. This has allowed regional differences to appear in the provision of these services between 2004 and 2007.

5.4.2 Median Wait Times by Individual Determinants Using NBRS and Census Data

In order to meet the second objective which is to analyse waiting times by individual determinants of access, median wait times were calculated by:

- age groups
- gender
- ethnicity
- deprivation.

Each of the categories was separated as explained under the grouping variables heading above. For analysis purposes there were six age groups, and five ethnic groups, and deprivation which was reported by decile was also aggregated into quintiles for separate analysis.

Analysis of the Total NBRS Dataset by Individual Patient Attributes

Once the NBRS data file was complete within SPSS, analysis was run on waiting times using age, gender, ethnicity and deprivation variables to bring out variations in access determined by individual factors.

Analysis of Individual Patient Attributes by DHB of Origin

To understand whether individually determined inequalities in waiting time vary geographically, analysis was run on ethnicity and deprivation for each of the DHBs. Medians were calculated for each ethnic group, and for each quintile of deprivation in each of New Zealand's 21 DHBs.

Analysis of Ethnic Differences When Other Individual Factors are Considered

As ethnic inequality is reported throughout Chapter 3 and 4, especially in relation to Maori and Pacific Island Communities it was decided to split the NBRS data file between this

subgroup of New Zealand patients and Europeans waiting in the booking system. This allowed the consideration of age, gender, urban-rural influence and deprivation-related effects on the waiting times of these two defined subgroups of the population; Maori/Pacific ethnic groups compared with Europeans. The author calculated the DHBs with the five highest and three lowest population proportion of Maori/Pacific communities in relation to Europeans. Then the waiting times of each group were separated by gender by each DHB, the discussion is focuses on both ethnic and gender differences.

Median wait time was also used to make comparisons between urban and rural classifications. However, these results were seen as evidence of an environmental factor and were therefore thought to be more applicable to meeting objective 3.

5.4.3 NMDS Analysis

The third objective aims to understand contextual factors for patients' access to elective surgery. A major factor in determining public hospitals throughput of operations and ultimately patient waiting time has to be the presence of the private hospital sector since a large percentage of medical specialists work in both sectors. The private sector is thought to have positive and negative impacts on the efficiency and throughput of public services as has been discussed throughout Chapters 2 to 5. Therefore, it is useful to consider admission rates in both the public and private sectors to establish if private hospitals are having an overall beneficial effect on public waiting lists.

Two measures were incorporated in this analysis. Firstly, overall admission rates for each of DHB were produced for the public and private sectors in provision of elective surgery during 2004-2007 using hospital admissions data from the NMDS Dataset. Admission rates were extracted from NMDS databases for the years 2004-2007 separately for the public and private sector. These were then broken down by DHB in order to be able to examine regional differences in the provision of each kind of treatment. Rates were calculated for all elective surgery admissions as narrowed down and discussed previously in Section 5.3.2 above. For the second measure, all admissions of those patients who originated from a CAU with a NZ Dep2006 score of 8, 9 or 10 were separated from the NMDS datasets and admission rates were calculated for this subset of the population. This gave a means of comparison between the total population's use of public and private health systems versus patients that come from more deprived communities. This is important to consider as lower

socio-economic groups traditionally suffer lower levels of access to private services in particular. Admissions data is shown in Appendix 3.

To compare the incidence of hospital admissions between the public and private sectors, it is important to make sure the difference observed is not simply due to the age structures of the populations involved. The fact that health outcomes change as we age means that we should consider standardising for age so comparisons can be made in hospital admission rates between the public and private sector. To do this the standard population by DHB in each of the predefined age groups was required. These are shown in Table 32 which is also attached in Appendix 3 and taken from the 2006 Census (Statistics NZ, 2006). The analysis would also require the populations for NZ Dep 2006 deciles 8-10 within New Zealand's total population. These figures were produced by Statistics New Zealand in 2001 as a projection using population growth models. This data was not produced as part of the 2006 census (Statistics NZ, 2001a).

Standardisation

The characteristics and distribution of the population within the admissions dataset may influence results. Age-based differences can present themselves where conditions require elective surgery are more common amongst older groups than amongst their younger counterparts (Borman, 1995). For example, you would expect an area with a high proportion of retirees, like Waikanae, located just north of Wellington, to have a higher demand for elective treatments than Wellington CBD which tends have a high proportion of young working age people. Crude rates do not account for such differences. It was for this reason that the author choose to age-standardise using the 'direct method' admission rates from the NMDS dataset.

By using the 'direct method' to standardise admissions data it is assumed that the distribution of the population in various age groups of the studied group(s) is the same as that in the standard population. Essentially it determines how many elective surgery hospital admissions would have occurred in the study group if it had the same age structure as the standard population. The age-standardised rate is calculated by summing the age specific rates for each age group, dividing by the New Zealand standard population then taking the result and multiplying it by a constant (in this case 1000).

Once rates were standardised for each DHB in the total NBRS dataset and the reduced dataset (NZ Dep 2006 quintiles 8, 9, and 10) for both private and public services the ratio of public admissions to private admissions in each DHB was able to be reported and comparisons were able to be made between that of the entire NBRS and the NZ Dep 2006 quintiles 8, 9, and 10 ratios. With these rates, confidence intervals and public/private ratios the author produced Table 28 comparing public and private systems and differences in the demand of elective surgery between the entire New Zealand NMDS dataset and further deprived communities.

Confidence Intervals

To give an indication of uncertainty for the calculation of age standardised admission rates confidence intervals were calculated. Statistical uncertainties arise because rates are based on a random sample of limited sample size from a population of interest. Confidence intervals are then used to assess what would happen if the same study was repeated using different samples each time. However, in this research, the dataset is not based on a sample and is therefore not subject to sampling error. It is, however, vulnerable to variations in referral practice, changes in coding procedures and accuracy of reporting. Therefore, the confidence interval is a way of expressing the stability of the admission rates. The smaller the interval, the more stable the rate. More admissions lead to a smaller interval, so admission rates in DHBs of low populations will have quite high intervals and rates are likely to be unstable.

5.4.4 Combined Analysis of NBRS, NMDS and Census Datasets

Correlation and Regression

The methods of correlation and regression explained below were done to compare the results generated from each dataset. In fulfilment of objective 2, contextual effects on the hospital sector are able to be measured by comparing the public and private admission rates to public waiting lists experienced within the NZBS.

Correlation and regression analysis were used to test the relationship between admission rates and waiting times resulting from NMDS and NBRS analysis. In this thesis the P value and R^2 value were be used to validate the relationship between:

- public admissions and median waiting time
- private admissions and median waiting time
- public private admissions ratio and median waiting time
- crude rates of private hospital admissions and the median waiting time for Europeans versus Maori and pacific islanders
- crude rates of private hospital admissions and the median waiting time between the top and bottom 50 percentile of NZ Dep 2006 scores.

The P value assesses the likelihood of observing an association at least as large as the one seen in the analysis (Koepsell and Weiss, 2003). P values with a score of <0.05 were considered statistically significant. The R^2 value is a dimensionless value that measures the strength of the linear relationship between the dependent and independent variables. R^2 values range from 0 to 1 representing a perfect fit between the data and the line drawn through them, and 0 representing no statistical correlation between the data and the line (Le, 1998).

5.5 Geographical Information Systems and Spatial Information Applications

Rather than relying on tables and graphs which do not give a very good geographical representation of national and international results the author has decided to include maps by way of *Geographical Information System* (GIS) tools to present major findings.

Coordinate Systems, Projections and Layers

For maps limited to New Zealand, the New Zealand Map Grid projection was used in parallel with a New Zealand DHB administrative boundary layer to present results by health service provider. Each map is captured in a data frame.

When results were combined with Australia separate data frames were used for results. For New Zealand results the *World Geodetic System* (WGS) 1984 was used and projected in New Zealand Transverse Mercator presented with a New Zealand DHB administrative boundary layer. In the Australian data frame the WGS 1984 coordinate system was used in combination with a layer containing the administrative boundaries for each State and Territory of Australia.

Process of Data Coding

Results that were suitable for presentation using Arc GIS were copied into a Microsoft Excel sheet with according to which DHB, Australian State or Territory the result came from. In Arc GIS the data frame containing the appropriate coordinate system, projection and layers were then joined to the Excel spread sheet.

Presenting Results

In order to present results clearly the symbols were changed on each map to quantitiles (graduate colours) and the classification was changed to quintiles. The results were displayed in five equally distributed groups to avoid distortions. A colour ramp was developed and imported to Arc GIS from *www.colorbrewer2.org* which is a website that gives free colour advice for cartography. Maps were then labelled according to data frame and a legend, scale, title and north point were also added and exported to 300DPI JPEG files for final presentation in Microsoft Word.

5.6 Interviews

Interviews were conducted during a trip to Wellington over the period 1st to 9th of February, 2010 with the intention of validating results and discussing various topics that have an effect on the delivery of elective surgery in New Zealand. Interviewees were a mix of medical specialists and hospital and management staff. They included:

- Specialist A is a urologist who works exclusively in the private sector from his consulting rooms, operates out of Southern Cross Hospital and fulfils a senior appointment at the Wellington School of Medicine. Specialist A divides his time equally between the private sector and his university role.
- Specialist B is an orthopaedic surgeon who divides his time between public and private practice based in Wellington. Specialising in lower arm Associate Specialist B also holds a senior academic appointment in the School of Surgery and Anaesthesia at the Wellington School of Medicine. He works four half days for the Capital and Coast DHB, five half days for the university and the other half day works in private practice based at Wakefield Hospital.

- Specialist C is an ophthalmologist who works a mixture of public and private practice and is based in Wellington. Specialist C operates at Wellington Regional Hospital one day a week and spends the remainder of his time working out of his private practice in the Wellington CBD.
- Administrator A is a health administrator and the Chief Executive of the New Zealand Orthopaedic Association. The New Zealand Orthopaedic Association represents all orthopaedic surgeons as subscription paying members and their function is not only to provide training for surgeons coming through but to run advocacy work for orthopaedics.
- Administrator B is a general physician who works exclusively in the public sector. He was also a board member for the Capital and Coast DHB and remains a senior lecturer at The Wellington School of Medicine.
- Administrator C is the nurse manager of the waiting list for publicly funded orthopaedic surgery at Wellington Regional Hospital.

The interviews have been transcribed and will be used in Chapter 9 when discussing the results and drawing conclusions about the research that has been carried out for this thesis. When referring to the interviewees in Chapter 9 names will not be provided, the author will simply name the source as a hospital administrator or a specialist.

5.7 Limitations in Data Collection and Analysis

Residual Waiting List

The problem with the way the booking system has been set up means that patients that are on the 'residual waiting list' are not reported. Instead patients that fail to meet the DHBs' financial threshold at FSA are referred back to their GPs for on-going management without being reported to the NBRS Database. Therefore, we are not able to get an indication of the size or makeup of this group. The residual waiting list as described in Chapter 4 contains a hidden group of patients and is an important aspect of this thesis that could not be examined.

CPAC Scores

CPAC scores are reported on the NBRS Database for the years 2004 to 2007 but could not be included in analysis for this thesis. It is evident that although CPAC scores were designed

to be consistent across the country, the Ministry of Health places little restrictions on the DHBs' implementation of CPAC scoring. Although some operations have a consistently used CPAC score many procedures are not consistent amongst all 21 of New Zealand's DHBs. This thesis aggregates up by specialty but for a number of specialties CPAC scores could not be relied on to provide an accurate measure of clinical need for each DHB. Because CPAC scores are not consistently generated using national prioritisation tools they were not included in the analysis of this thesis.

Alignment with MoH Reporting Systems

The MoH uses ESPIs to determine DHB performance in meeting timeframes for patients treatment. ESPI 5 indicates the number of patients who wait more than 180 days between their commitment to treatment and their date of surgery. Because DHBs have the ability to decide which patients get a commitment to treatment, DHBs only commit to the number of patients that they can conceivably treat within 180 days. For this reason, all the DHBs are meeting their targets as shown in Figure 12 and discussed throughout Chapter 4. Because, DHBs have the ability to alter the commitment to treatment the ESPI measure is not giving a true indication of need. In order to get a true indication of waiting time and a better indication of service delivery within each DHB the commitment to treatment was replaced with FSA.

Problems with the NMDS Database

After initial viewing of the NMDS database it was realised that something was not right with the private admissions data. After consulting the MoH the discovery was made that Canterbury DHB was the only DHB to report private surgical interventions by specialty. All other DHBs had reported private hospital admissions under general surgery. Originally, it was planned to work out the public and private specialty specific admission rates and relate these back to waiting times in the relevant specialty for the public sector. Derrett et al (2009) were able to successfully undertake similar analysis as they used individual procedure codes which the private hospital sector does report to the DHB and is found in the NMDS dataset. But, because the specialty codes are not reported, private admission rates could not be broken down to this level.

The Use of Means for Measuring Average Waiting Time

It must be noted that the results shown in Table 9 consist of 'means'. When means are used as an average scores it can leave the results vulnerable to being skewed by numbers that are outside the normal range of the dataset. The NBRS data can be affected in this way particularly when patients are lost in the system for a number of years before their operation exaggerates waiting times in some DHBs. Table 8 on page 110 shows the distribution of patients that have waited certain lengths of time for surgery. Patients in the highest group of two years or more, contains some patients that have waited up to a maximum of 5356 days. 2.6% of patients waited over 731 days for treatment and such patients may skew results for certain DHBs. For this reason the author shifted analysis to focus on median waiting times to eliminate such bias.

Admission Rates

When admission rates were standardised for age, populations for specific age groups throughout New Zealand were based on the population at the time of the 2006 census. Age group populations for NZ Dep 2006 and by ethnicity admission rates were based on population forecasts from the 2001 Census for the year 2006. Also, when the crude admission rates were calculated between Europeans and Maori and Pacific Islander at the end of Chapter 8 the European population includes all other minorities other than Maori and Pacific Island populations. This should not make much of a difference though because Europeans make up the majority of this group.

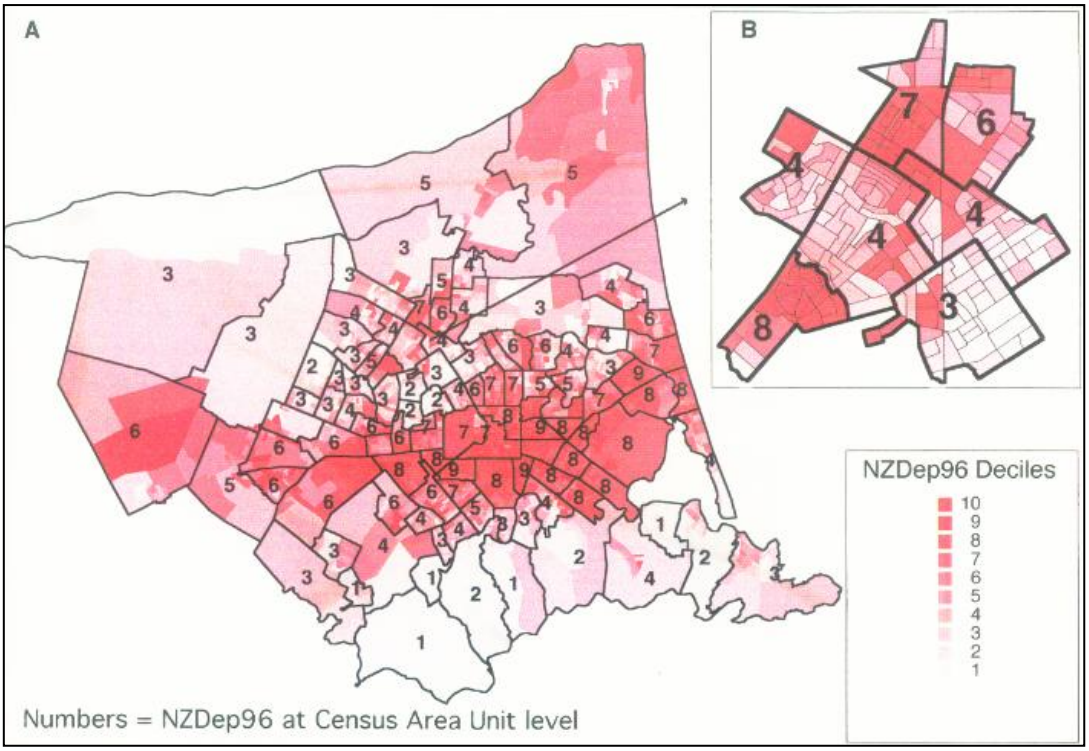


Figure 19: Aggregation of Mesh Block to Census Area Unit for NZ Dep96 (Lauer, 1999)

There were also some surprising results that came out with high numbers of private patients, particularly those residing in highly deprived neighbourhoods. Firstly, this suggested that this could be due to outsourcing of surgery to the private sector but after consulting the MoH they told us that public hospital admissions that fall in the NMDS database are coded in such a way that they capture the small percentage of cases that are outsourced by way of contract to the private sector. The MoH suggested either they had either been coded incorrectly or problems had been created when NZ Dep 2006 meshblocks were aggregated up to CAU. This is caused when a CAU is used to represent a number of meshblocks in an area. Some CAUs represent ten or more meshblocks in some regions, especially urban areas of high density. Figure 19 shows this occurring in Christchurch City, area A represents CAUs and area B shows one CAU made up of many meshblocks. In this case the meshblocks vary between three and eight but because the analysis is aggregated up to CAU level the NZ Dep (1996) score is four. Therefore, problems can occur when CAU NZ Dep scores misrepresent the underlying meshblocks.

5.8 Conclusion

This chapter has summarised methods that have been used in analysis for the remaining chapters of this thesis. The chapter firstly outlined the structure of the results, discussion and concluding sections of this thesis. The scale of research and source of data have also been mentioned along with a detailed description of the information, particularly of that held within the NMDS and NBRS datasets. Then an outline was provided of on the organisation of the data and the process that was involved in analysis to deliver the results that are seen in the following chapters. Interviews were provided to aid the discussion and strengthen the validity of the research findings. The content and the process involved in arranging these interviews was then discussed before outlining the limitations that were found throughout the analysis. From here the thesis moves onto the three results chapters, the first discussing geographical differences in waiting times.

6 Geographical Performance of the New Zealand Booking System (NZBS)

6.1 Introduction

The purpose of this chapter is to satisfy objective 1. That is to display results which show how elective surgical waiting times vary geographically between DHBs between 2004 and 2007. There are three specific aims that this chapter sets out to achieve. The first is to find out whether or not public waiting times vary by DHB. Secondly, to carry out Australian and New Zealand comparisons with results published by the AMA Public Hospital Report Card. The third aim is to identify inter-specialty variations to see if differences in public waiting times are inflated compared to that of the entire booking system.

The chapter begins by displaying national results taken from each of the 21 DHBs that administer the NZBS. Significant national trends were generated from NBRS data during the study period and will be discussed. Australian waiting times were taken from the AMA Public Hospital Report Card and compared with NBRS waiting times over the same period. A significant gap between New Zealand and Australian performance in waiting times for publicly funded elective hospital procedures are observed and discussed. Median waiting times are finally broken down by specialty in the top five most common surgical specialties in the private sector. Results show a variety of regional differences from specialty to specialty but all show variance between peoples' access to elective surgery depending on where in the country they reside.

6.2 Elective Surgery Waiting Times

6.2.1 Mean Waiting times by DHB

Mean waiting times are shown in Table 9 which illustrates the large variability of waiting times by DHB over the four year study period. Although waiting times trend downwards over the study period, for the country as a whole there is little continuity between individual DHBs. Some tend to be on the increase (e.g. Capital and Coast), others have decreased (e.g. South Canterbury) but many show yearly fluctuations with no apparent trend.

DHB	2004	2005	2006	2007	(04-07)
Northland	166	189	171	151	169
Waitemata	140	122	129	92	121
Auckland	130	149	135	117	133
Counties Manukau	141	177	104	84	127
Waikato	168	115	134	151	142
Lakes	145	139	159	144	147
Bay of Plenty	130	155	136	127	137
Tairawhiti	183	138	172	130	156
Taranaki	91	123	124	115	113
Hawke's Bay	169	154	171	161	164
Whanganui	99	107	122	109	109
Mid Central	151	147	166	122	147
Hutt Valley	144	165	186	153	162
Capital and Coast	141	152	193	193	170
Wairarapa	111	128	131	121	123
Nelson Marlborough	187	191	168	137	171
West Coast	170	179	179	154	171
Canterbury	248	236	209	102	199
South Canterbury	198	192	133	101	156
Otago	156	163	149	110	145
Southland	196	201	186	141	181
New Zealand	158	164	154	125	149

Table 9: Mean Wait Time Between FSA and Surgery Date by DHB

Figure 20 illustrates the yearly results over the study period for each DHB. It must be noted that maps showing temporal change throughout Chapter 6 are displayed independent of each other in quintiles so that the best and worst performing DHBs of each year are clearly illustrated. It is evident that in the first two years that North Island DHBs performed far better than their South Island counterparts. A shift occurs in 2006 and 2007 when South Island DHBs (with the exception of the West Coast) begin to outperform some of the North Island DHBs, particularly Capital and Coast, Hutt Valley and Hawkes Bay. The reader will also notice that for the most part Waitemata, Taranaki, Whanganui and Wairarapa DHBs seem to consistently perform well. DHBs that consistently struggle containing waiting times include Northland, Lakes, Hawkes Bay, Hutt Valley, Capital and Coast, and all of the South Island DHBs.

Figure 21 displays the mean waiting time for each DHB for the entire four year study period. This map clearly illustrates some disparity between the North and South Islands. As one would expect similar trends come through for better performing DHBs against those with higher waiting times. It shows a large range between Whanganui as the best performer with a mean waiting time of 109 days to Canterbury which has a mean waiting time of 197 days.

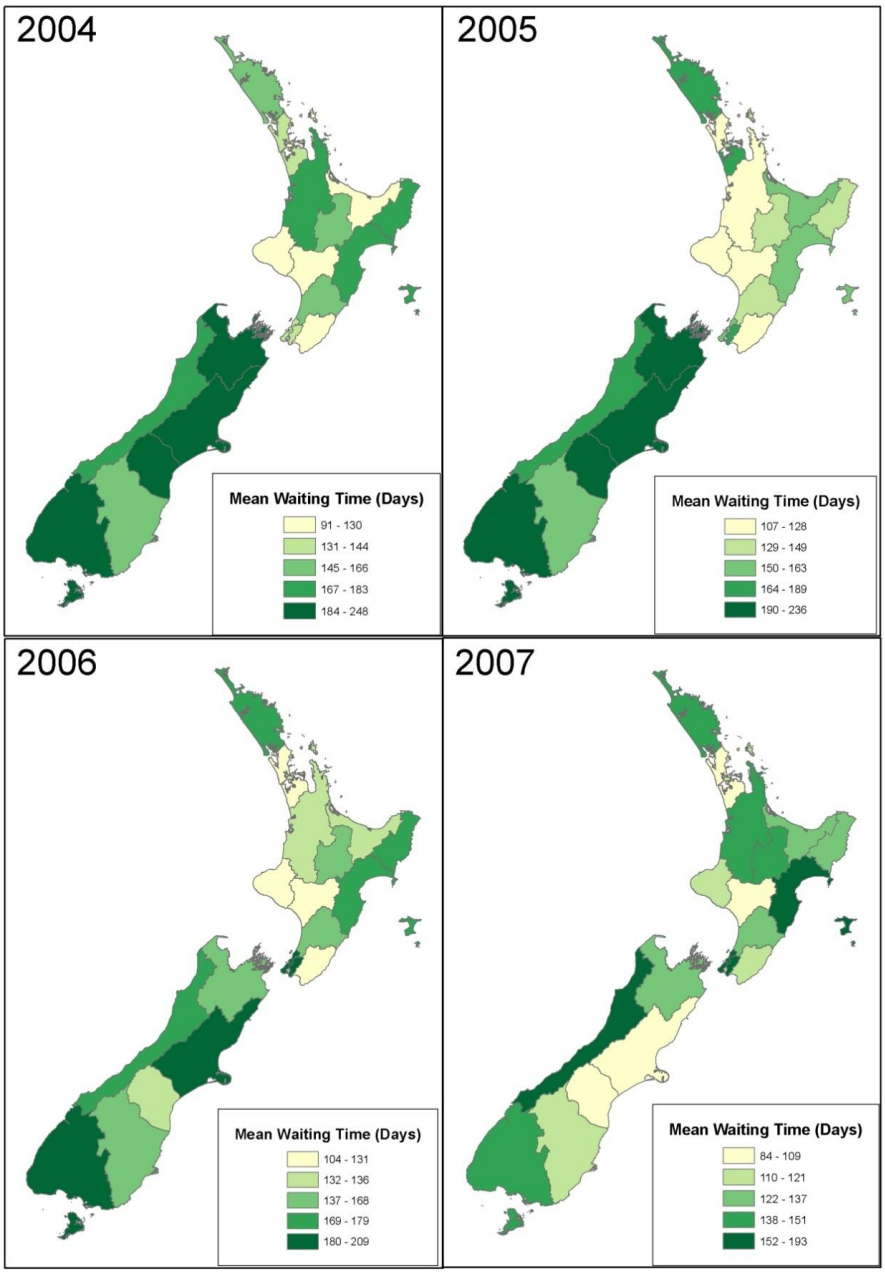


Figure 20: Mean Waiting Times in 2004, 2005,2006 and 2007 by DHB

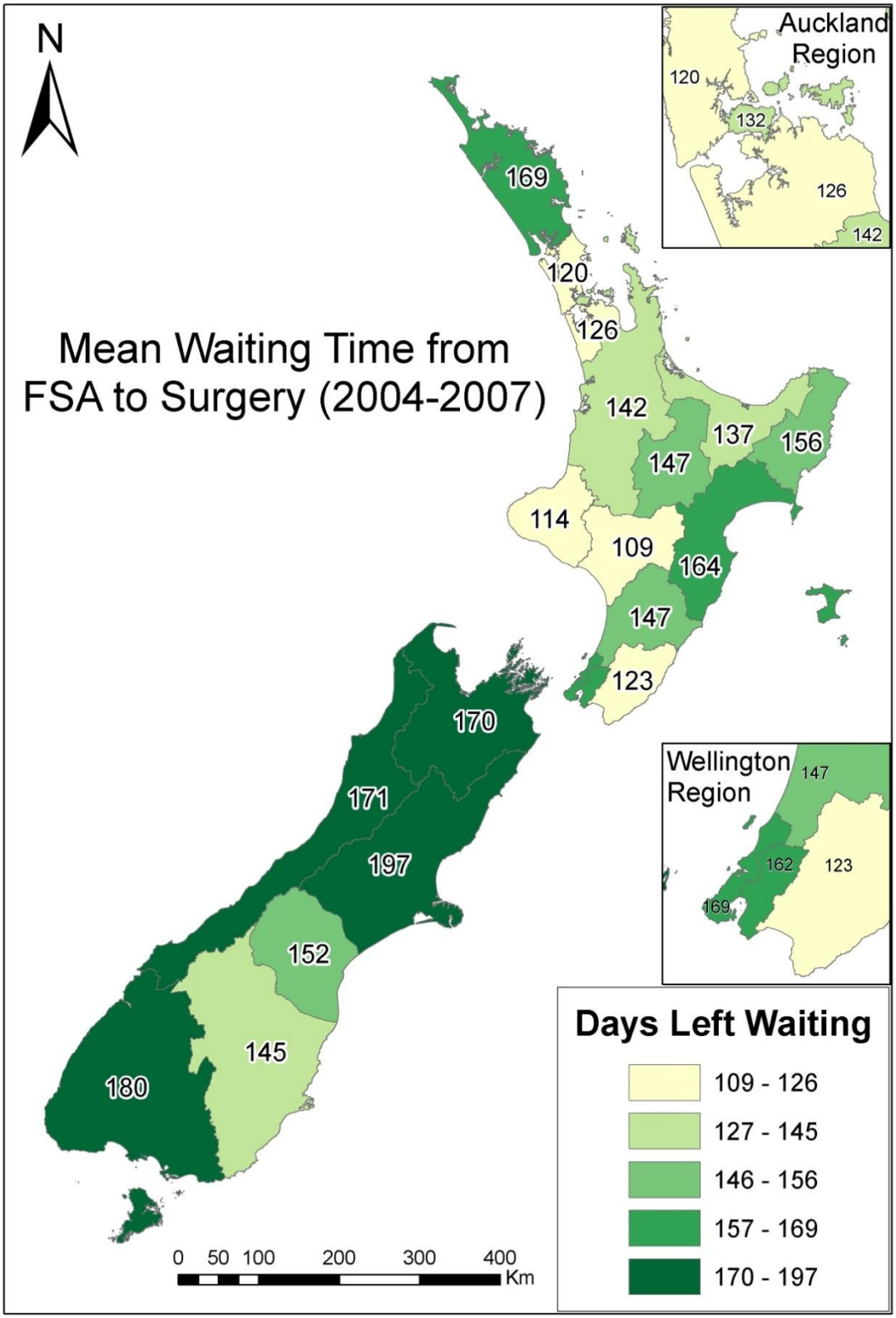


Figure 21: Mean Waiting Times over Period 2004-2007 by DHB

6.2.2 Median Waiting Times by DHB

Table 10 shows the median waiting times by DHB over the four year study period. As the reader will notice, figures are lower than mean scores which were created for the results depicted in Section 6.2.1. The median being the middle number within the sample avoids the exaggeration effect that is realised when using mean score as an average. For the remainder of the results sections of Chapters 6 and 7 medians will be used to calculate the average waiting time.

DHB	2004	2005	2006	2007	(04-07)
Northland	67	82	101	97	87
Waitemata	72	58	65	49	61
Auckland	69	77	79	62	72
Counties Manukau	69	80	63	55	67
Waikato	77	50	84	64	69
Lakes	64	67	79	63	68
Bay of Plenty	59	67	66	60	63
Tairawhiti	51	47	77	70	61
Taranaki	56	78	77	69	70
Hawke's Bay	71	67	91	78	77
Whanganui	55	55	62	54	57
Mid Central	72	75	100	67	79
Hutt Valley	96	119	119	86	105
Capital and Coast	89	94	123	95	100
Wairarapa	58	70	65	71	66
Nelson Marlborough	85	90	80	72	82
West Coast	68	64	94	92	80
Canterbury	108	99	98	61	92
South Canterbury	86	85	75	61	77
Otago	94	78	90	71	83
Southland	90	83	86	74	83
New Zealand	75	76	82	65	74

Table 10: Median Wait Time Between FSA and Surgery Date by DHB

As well as lower averages produced using the median rather than the mean scores the reader will notice different variations in waiting times between DHBs. Most DHBs show year to year fluctuation but few DHBs show clear up or downward trends. This is mirrored in the overall New Zealand medians for each year within the study period.

Figure 23 still shows some evidence of a north-south gradient especially in 2004 and 2005 but this trend disappears in 2006 and 2007. Figure 22 shows each DHBs median waiting time in a bar graph with a trend line confirming the north to south gradient. The reader will also notice similar trends apply from what was seen in the mean results, that is for the most part Waitemata, Bay of Plenty, Tairawhiti, Whanganui and Wairarapa DHBs seem to consistently perform well. However, when considering median scores Northland, Capital and Coast, Hutt Valley and Canterbury stand out as by far the worst performers all averaging above twenty days more than the national average waiting time.

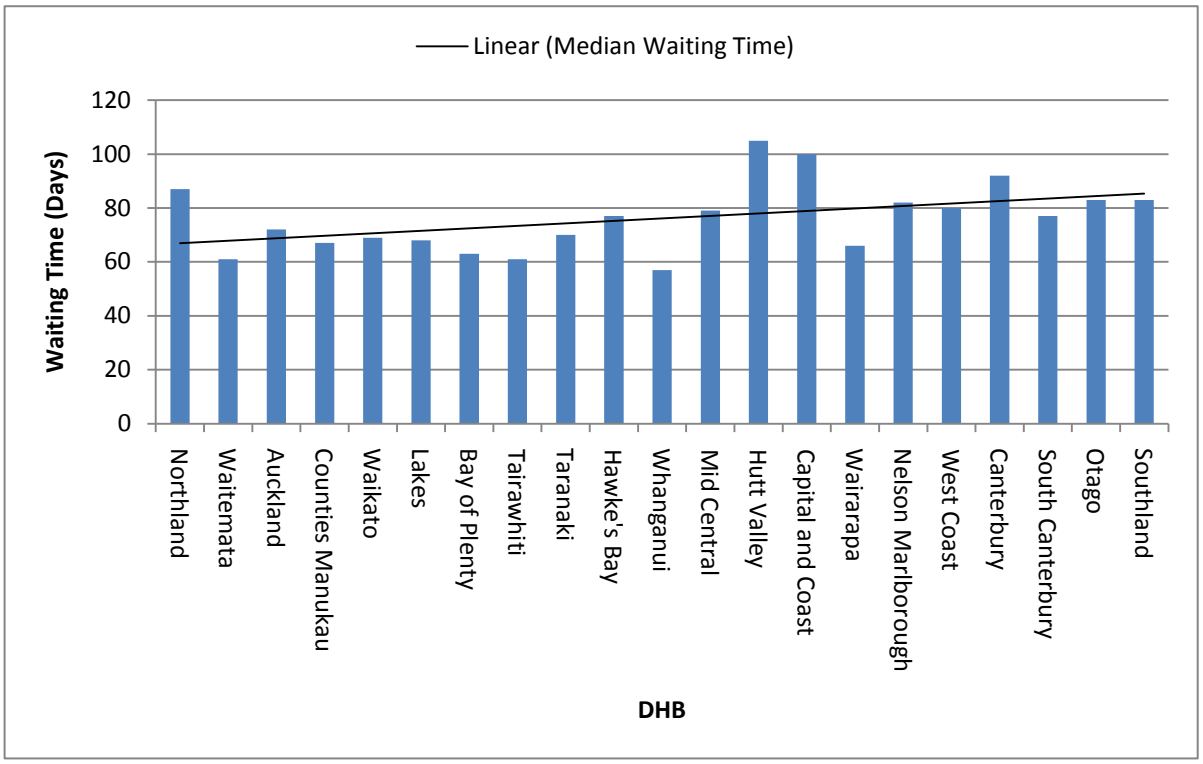


Figure 22: Median Wait Times per DHB 2004-2007

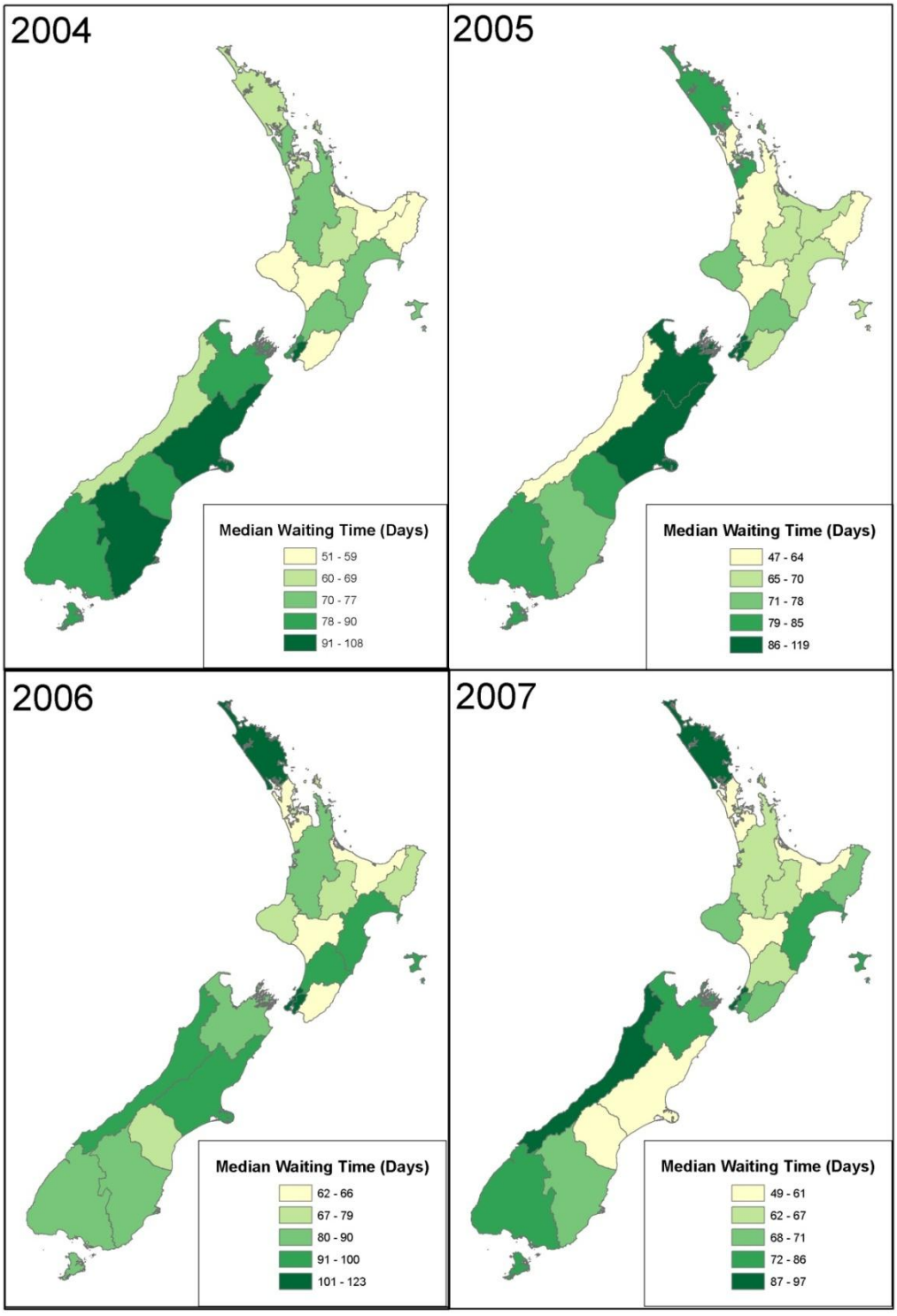


Figure 23: Median Waiting Times in 2004, 2005,2006 and 2007 by DHB

The underperforming DHBs are clearly illustrated (darker shading) in Figure 24 which displays the median waiting time for each DHB over the entire study period.

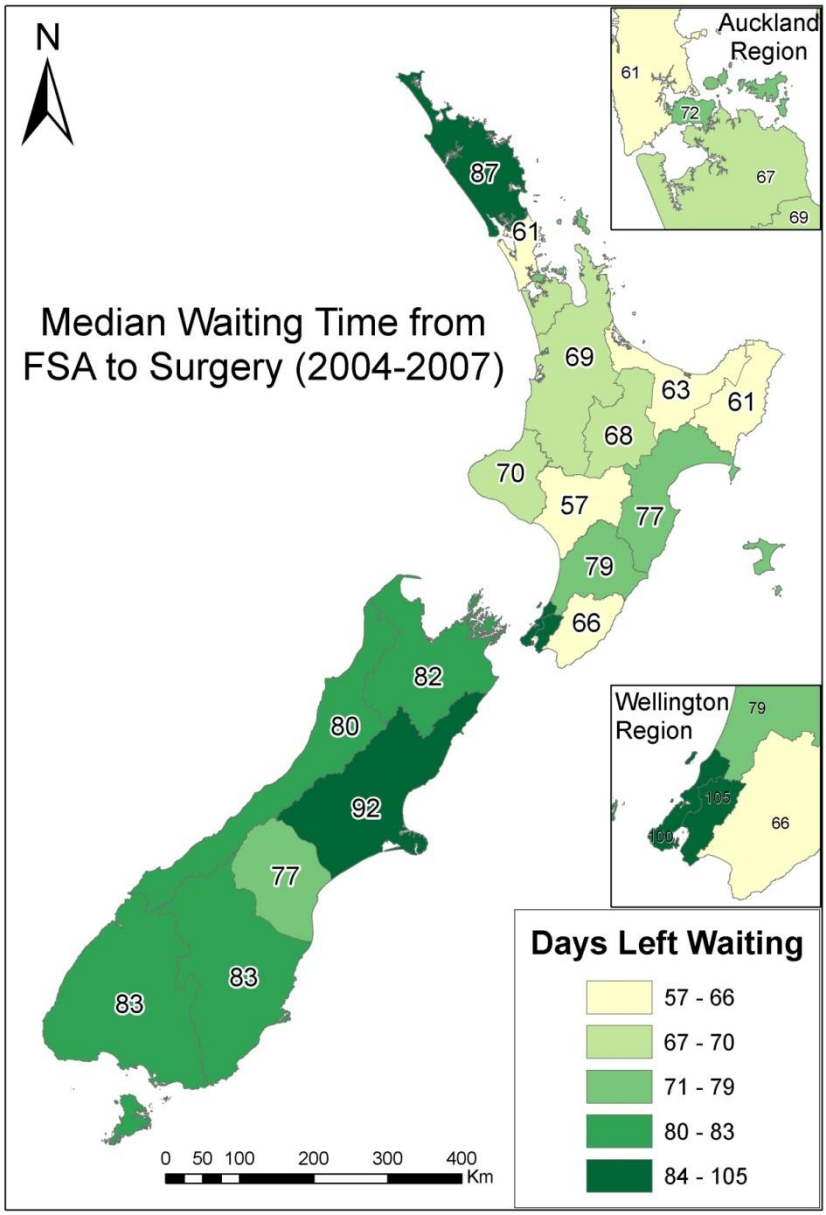


Figure 24: Median Waiting Times over Period 2004-2007 by DHB

6.2.3 Patients Waiting Over 6 Months for Treatment

For the next two sets of results instead of using averages the author has calculated the number of patients who do not receive treatment within a given period, and then converted

this into a percentage per DHB. Table 11 displays the percentage of patients that were not treated within six months of their FSA. This is useful as it recognises the individual DHB performance against Ministry of Health targets, specifically ESPI 5. ESPI 5 states that patients who are given a commitment to treatment must be treated within 180 days. Although, by replacing commitment to treatment with FSA we are gaining a far more legitimate estimate of waiting time as we have discussed in previous chapters of this thesis.

DHB (%) Year	2004	2005	2006	2007	(04-07)
Northland	27	29	31	29	29
Waitemata	23	19	21	14	19
Auckland	20	24	24	20	22
Counties Manukau	24	28	16	9	19
Waikato	29	15	25	25	23
Lakes	21	20	24	20	21
Bay of Plenty	21	26	22	19	22
Tairawhiti	25	20	28	23	24
Taranaki	11	24	24	17	19
Hawke's Bay	27	24	29	26	27
Whanganui	16	16	20	19	18
Mid Central	24	25	30	20	25
Hutt Valley	29	36	37	25	32
Capital and Coast	26	29	36	29	30
Wairarapa	20	24	26	20	22
Nelson Marlborough	31	31	26	19	27
West Coast	25	26	30	21	25
Canterbury	39	36	33	12	30
South Canterbury	34	31	21	17	26
Otago	29	27	25	16	24
Southland	32	31	26	23	28
New Zealand	26	27	26	19	24

Table 11: Percentage of Patients Waiting Over 6 Months For Treatment (%) by DHB

Table 11 and Figure 25 show similar north-south variations in the years 2005 and 2006 then during 2006 and 2007 the trend seems to reverse, seeing fewer people treated within 180 days in the North Island. However, the four DHBs that seem to be consistently bad performers are Northland, Hutt Valley, Capital and Coast and Canterbury.

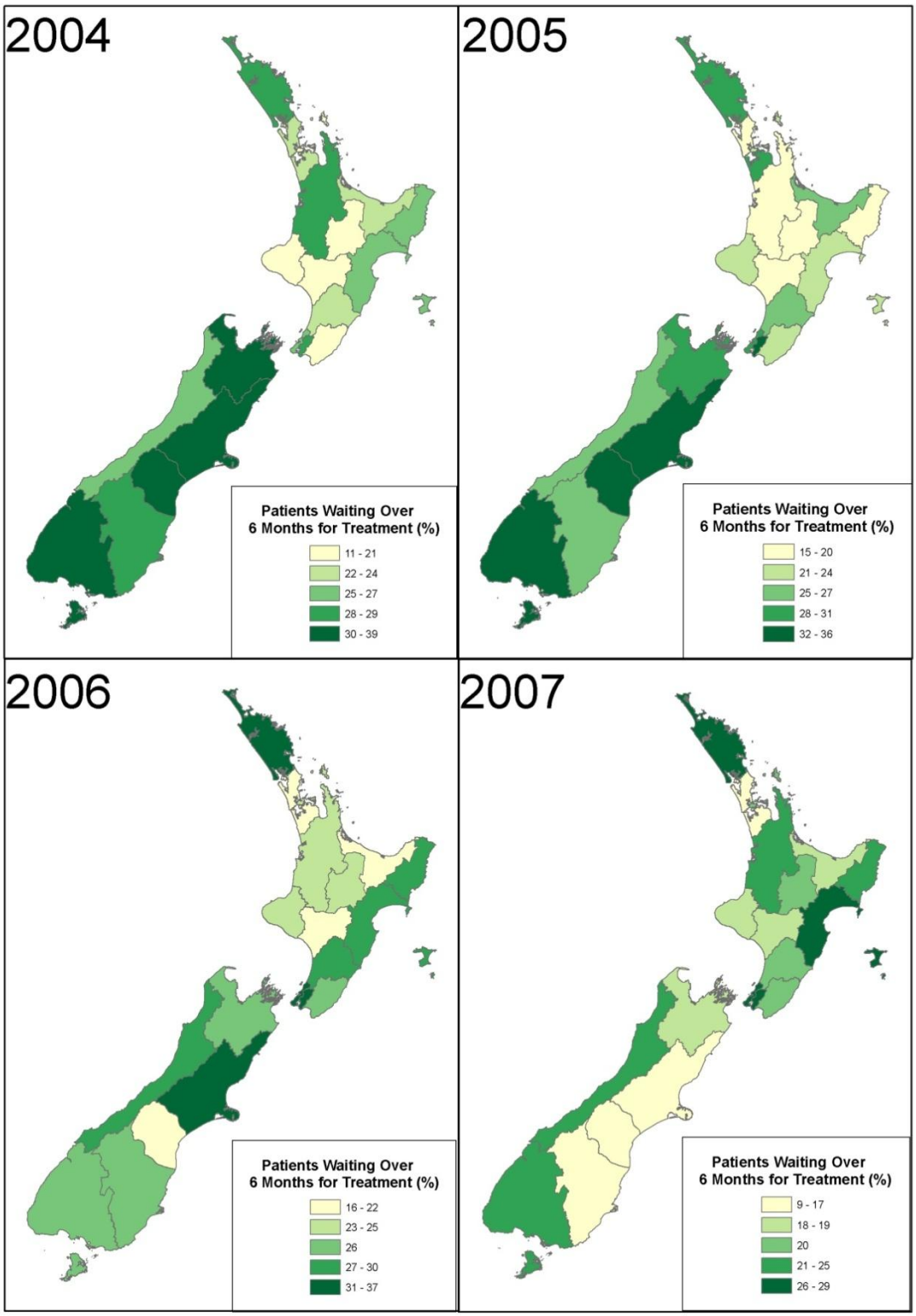


Figure 25: Patients Waiting over 6 Months for Treatment (2004, 2005, 2006 and 2007) by DHB

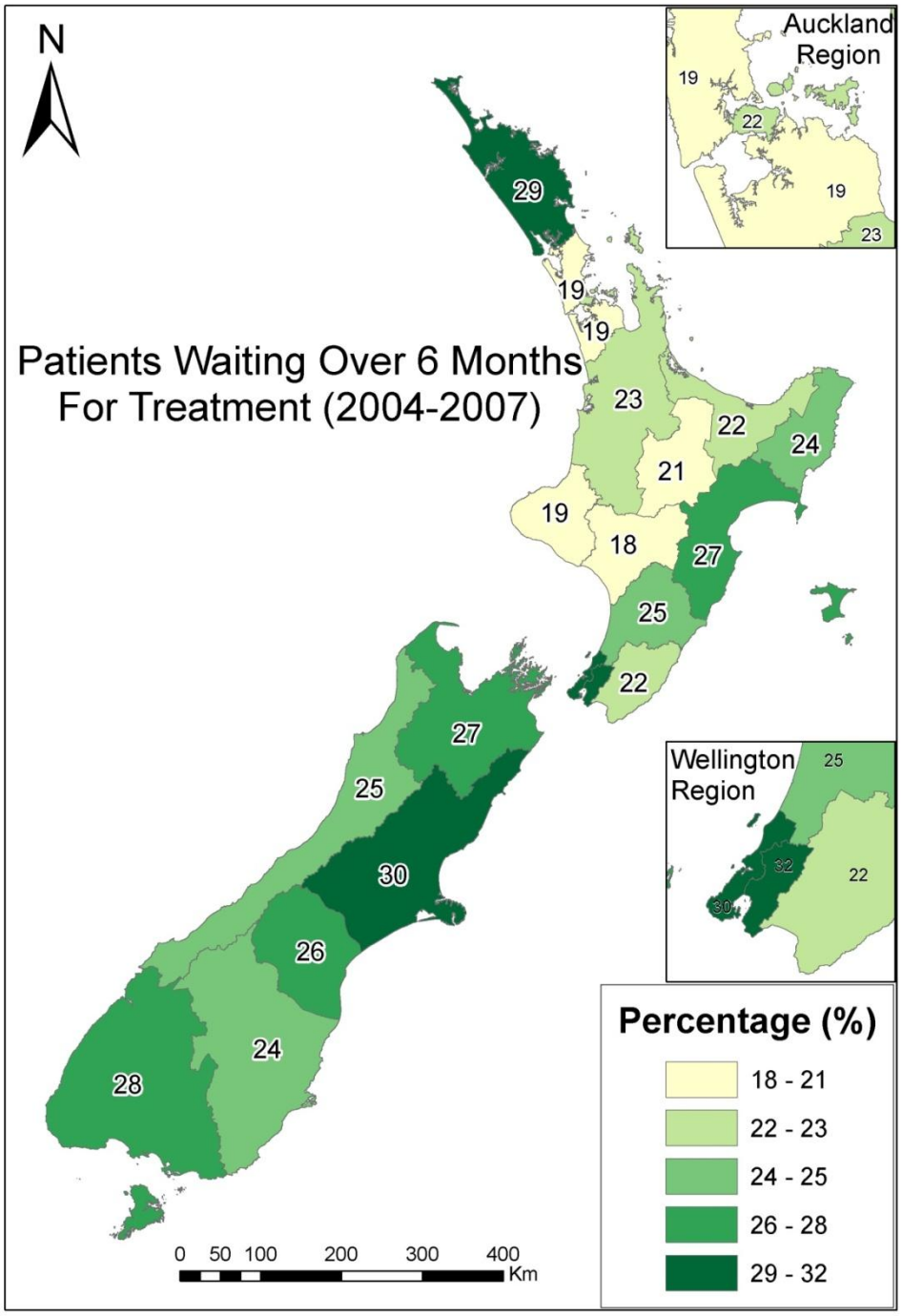


Figure 26: Average of Patients Waiting Over 6 Months for Treatment (2004-2007) by DHB

Figure 26 shows the percentage of patients that are not treated within 180 days in each DHB over the entire four year study period. This gives an accurate summary of performance showing the overall north south differences that we saw above in the waiting time averages.

6.2.4 Patients Waiting Over 12 Months for Treatment

To take this analysis a step further, the same methods were used to calculate the percentage of patients that are left untreated 12 months after FSA. This was done to see if a different picture would appear. Table 12 shows the percentage of patients waiting over 12 months for treatment in each DHB each year of the study and for the total period.

DHB (%) Year	2004	2005	2006	2007	(04-07)
Northland	14	14	12	9	12
Waitemata	10	7	8	4	7
Auckland	8	10	8	7	8
Counties Manukau	11	14	3	2	8
Waikato	14	7	6	11	10
Lakes	9	8	9	8	9
Bay of Plenty	9	12	8	7	9
Tairawhiti	14	9	14	7	11
Taranaki	3	5	5	5	5
Hawke's Bay	13	11	12	10	11
Whanganui	4	6	7	5	5
Mid Central	10	10	11	6	9
Hutt Valley	7	9	14	9	10
Capital and Coast	7	10	15	13	11
Wairarapa	5	7	8	5	6
Nelson Marlborough	15	16	12	7	12
West Coast	13	14	11	7	11
Canterbury	23	21	16	4	16
South Canterbury	17	15	6	3	10
Otago	10	11	9	4	9
Southland	15	15	12	7	12
New Zealand	11	12	10	6	10

Table 12: Percentage of Patients Waiting Over 12 Months For Treatment (%) by DHB

As can be seen in Figure 27 and Figure 28, the results are proportionately very similar and show the same trends as the analysis done for the 180 days.

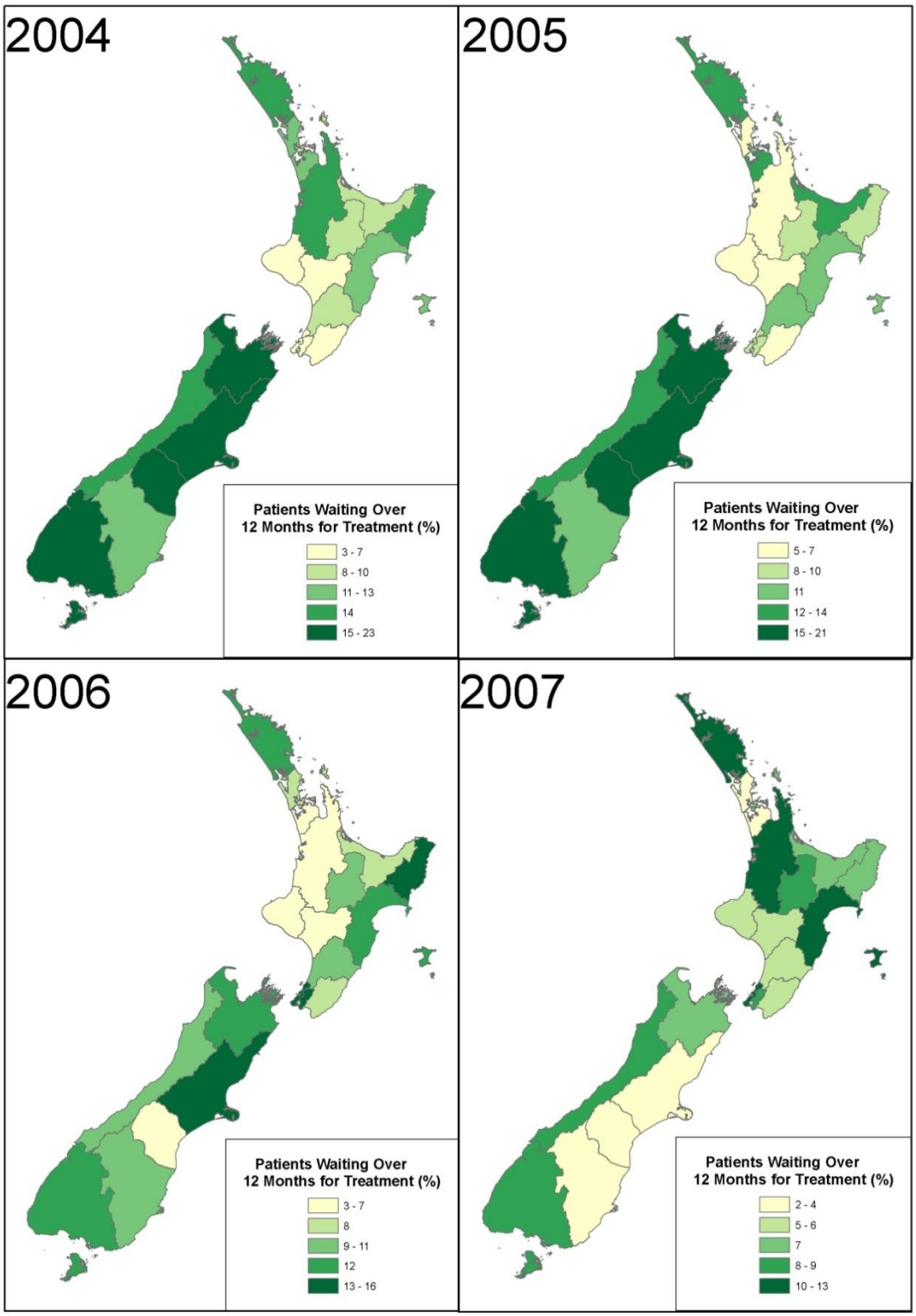


Figure 27: Patients Waiting over 12 Months for Treatment (2004, 2005, 2006 and 2007) by DHB

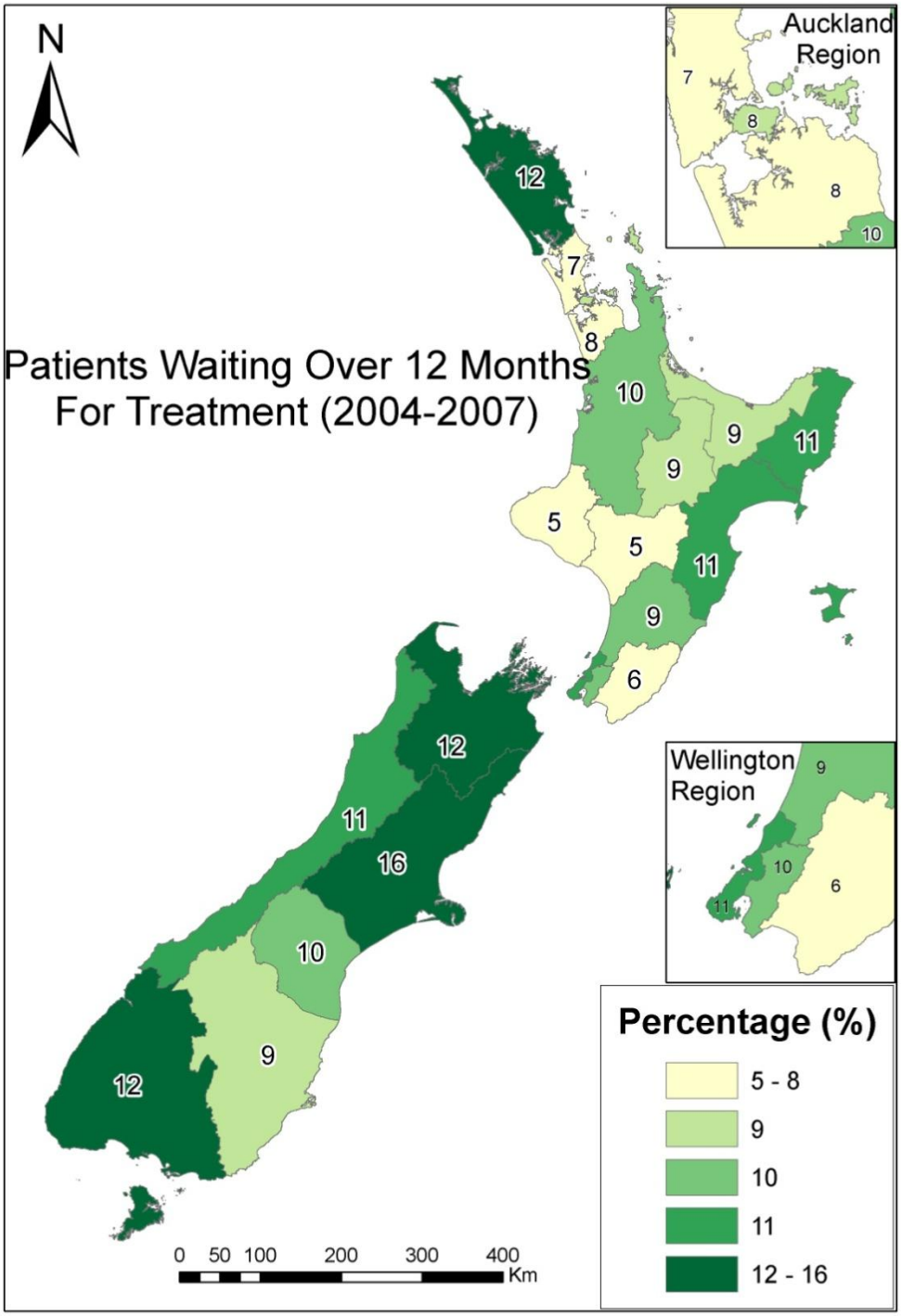


Figure 28: Average of Patients Waiting Over 12 Months for Treatment (2004-2007) by DHB

6.2.5 Australasian Median Waiting Times

The waiting times experienced by New Zealanders (listed in Table 10) were compared with Australian medians over the same period. These results produced by the AMA (2009) are displayed in Table 13. The mean of the study years was taken and compared with New Zealand results to create

Australia (State/Territories)	2004	2005	2006	2007	Average (04-07)
New South Wales	34	36	35	39	36
Victoria	28	31	30	33	31
Queensland	22	25	25	27	25
Western Australia	27	28	29	30	29
South Australia	35	38	40	42	39
Tasmania	34	34	38	36	36
Australian Capital Territory	45	61	63	72	60
Northern Territory	28	30	35	43	34
Australian Average	32	35	37	40	36

Table 13: Australian Median Waiting Times by State/Territory During Years of Study

Figure 29 depict large differences between waiting times experienced in New Zealand compared to those in Australia between 2004 and 2007. With the exception of ACT, New Zealanders waited on average about double the time for elective surgery than the Australian public during these years.

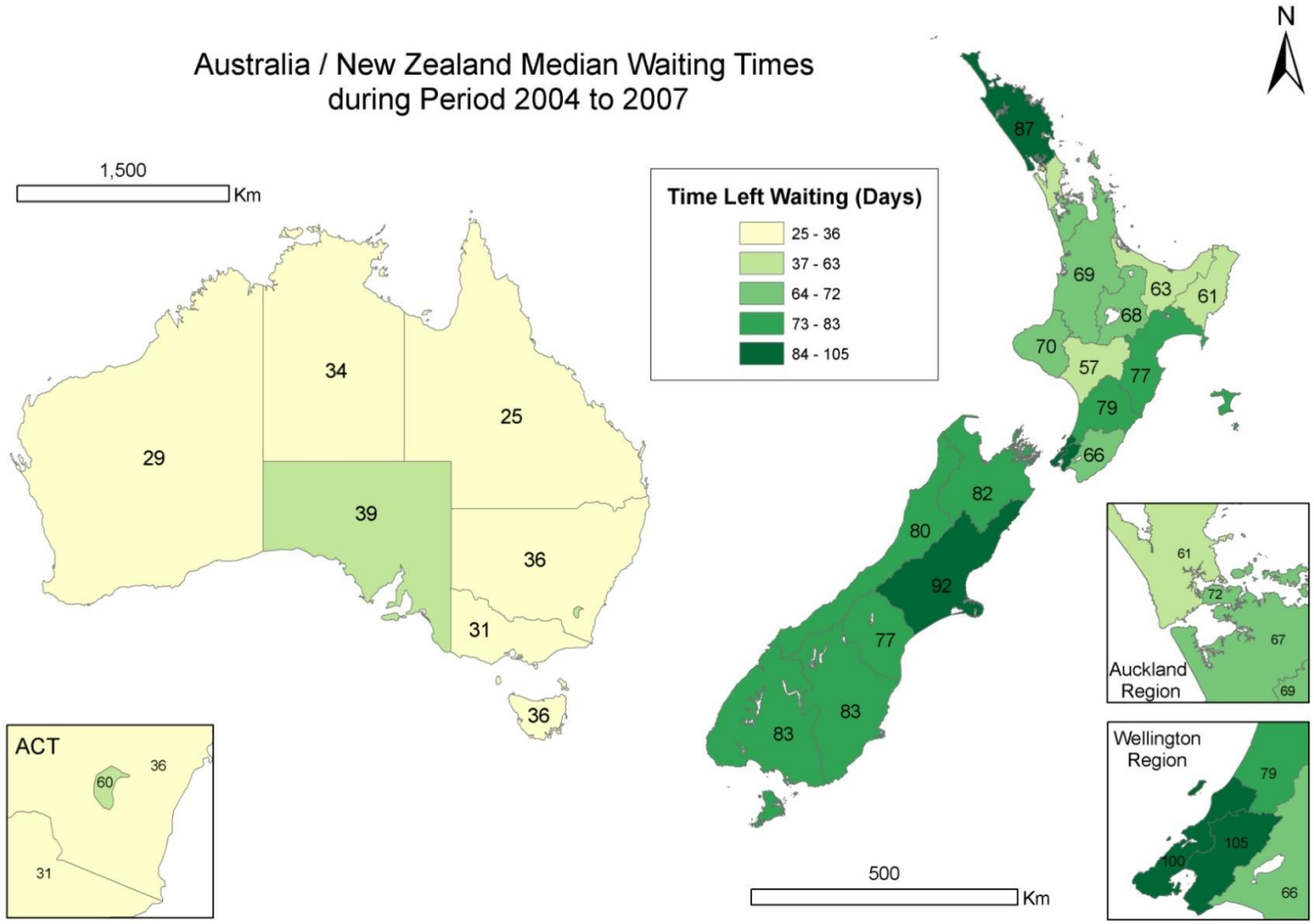


Figure 29: Australian and New Zealand Median Waiting Times by State, Territory and DHB (2004-2007)

6.2.6 Australasian Patients Waiting More Than 90 Days for Treatment

Table 14 displays published results from the Australian Public Hospital Report Card (AMA, 2009). These results show the percentage of patients in each state or territory that are treated within 90 days. For Table 15 the author has replicated the results for New Zealand so as to compare the New Zealand experience using the Australian Federal Government guidelines for recommended maximum wait time.

Australia (State/Territories)	2004	2005	2006	2007	Average (04-07)
New South Wales	71	70	74	75	73
Victoria	76	72	75	70	73
Queensland	91	84	82	83	85
Western Australia	68	68	67	70	68
South Australia	75	77	78	73	76
Tasmania	53	57	53	48	53
Australian Capital Territory	43	52	51	47	48
Northern Territory	68	61	57	58	61
Australian Average	68	68	67	66	67

Table 14: Australia: Percentage of Patients Receiving Treatment Within 90 Days (%) by State/Territory

New Zealand (DHBs)	2004	2005	2006	2007	Average (04-07)
Northland	57	53	47	48	51
Waitemata	57	62	59	69	62
Auckland	60	55	54	62	58
Counties Manukau	58	54	61	68	60
Waikato	54	69	52	59	59
Lakes	60	60	54	62	59
Bay of Plenty	61	58	59	62	60
Tairawhiti	61	65	54	57	59
Taranaki	68	54	55	60	59
Hawke's Bay	57	59	50	54	55
Whanganui	64	67	59	64	63
Mid Central	56	56	47	60	55
Hutt Valley	48	43	42	52	46
Capital and Coast	51	49	41	49	47
Wairarapa	62	57	57	56	58
Nelson Marlborough	51	50	54	58	53
West Coast	58	60	48	49	54
Canterbury	46	48	48	65	52
South Canterbury	51	51	56	61	55
Otago	50	52	51	58	53
Southland	49	53	57	57	54
New Zealand	55	55	53	60	56

Table 15: New Zealand: Percentage of Patients Receiving Treatment Within 90 Days (%) by DHB

Figure 30 uses the average percentage from the four years, 2004 to 2007 in each country to compare the performance of each state, territory and DHB. As the reader will notice the results remain similar to Figure 29 in that Australia has a far faster turnaround for patients with a larger percentage of patients treated within 90 days.

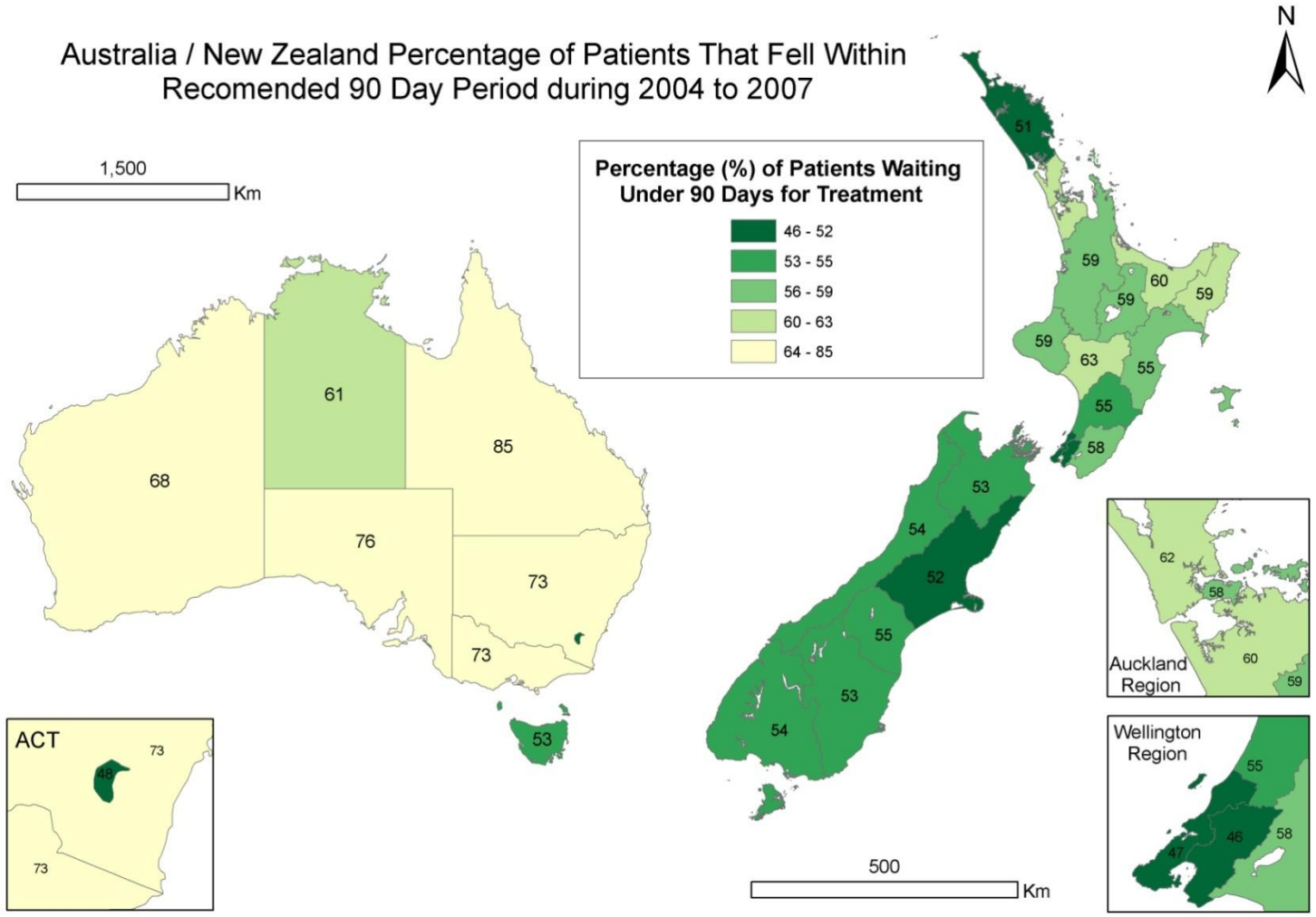


Figure 30: Australia and New Zealand Comparison of Amount of Patients that were Processed and Treated Within 90 Days (2004-2007)

6.2.7 New Zealand Waiting Times Broken Down By Specialty

For Table 16 the author broke down median waiting times for the 2004-2007 study period by the five most common privately funded surgical specialties (for elective treatments). In the right hand column is the median waiting time for each DHB for all elective procedures. As can be seen the median results for each of the DHBs vary considerably by specialty and some specialties perform better than others against the total elective median waiting time. General surgery had consistently lower waiting times than the other four specialties examined during 2004 and 2007. For each specialty a map was produced to show the geographical variation between DHBs.

DHB	General Surgery	Orthopaedics	ENT	Ophthalmology	Gynaecology	Total Elective
Northland	51	86	132	138	53	87
Waitemata	42	60	63	79	72	61
Auckland	63	71	63	78	62	72
Counties Manukau	60	65	64	79	58	67
Waikato	56	69	64	85	69	69
Lakes	57	68	67	70	68	68
Bay of Plenty	40	63	76	52	49	63
Tairawhiti	53	63	49	145	56	61
Taranaki	67	76	68	84	78	70
Hawke's Bay	48	70	66	112	56	77
Whanganui	43	77	83	102	102	57
Mid Central	36	56	104	35	61	79
Hutt Valley	71	99	85	165	90	105
Capital and Coast	91	103	127	177	78	100
Wairarapa	29	66	105	170	42	66
Nelson Marlborough	51	82	108	77	78	82
West Coast	65	80	131	97	55	80
Canterbury	46	85	104	105	63	92
South Canterbury	41	74	99	61	60	77
Otago	56	83	109	90	75	83
Southland	49	77	88	105	69	83
New Zealand	50	74	89	82	66	74

Table 16: Median Waiting Times of Top 5 Most Common Privately Funded Specialties 2004-2007

General Surgery

Figure 31 shows the median wait time specifically for general surgery procedures such as hernia repair, appendectomy, gallbladder removal, hysterectomy and so on. As can be seen in Figure 31 Taranaki, Capital and Coast, Hutt Valley and West Coast suffered some of the highest waiting times in New Zealand while Wairarapa DHB had a median wait time of less than half of these. This result shows huge variation in the waits experienced by patients but few regional trends.

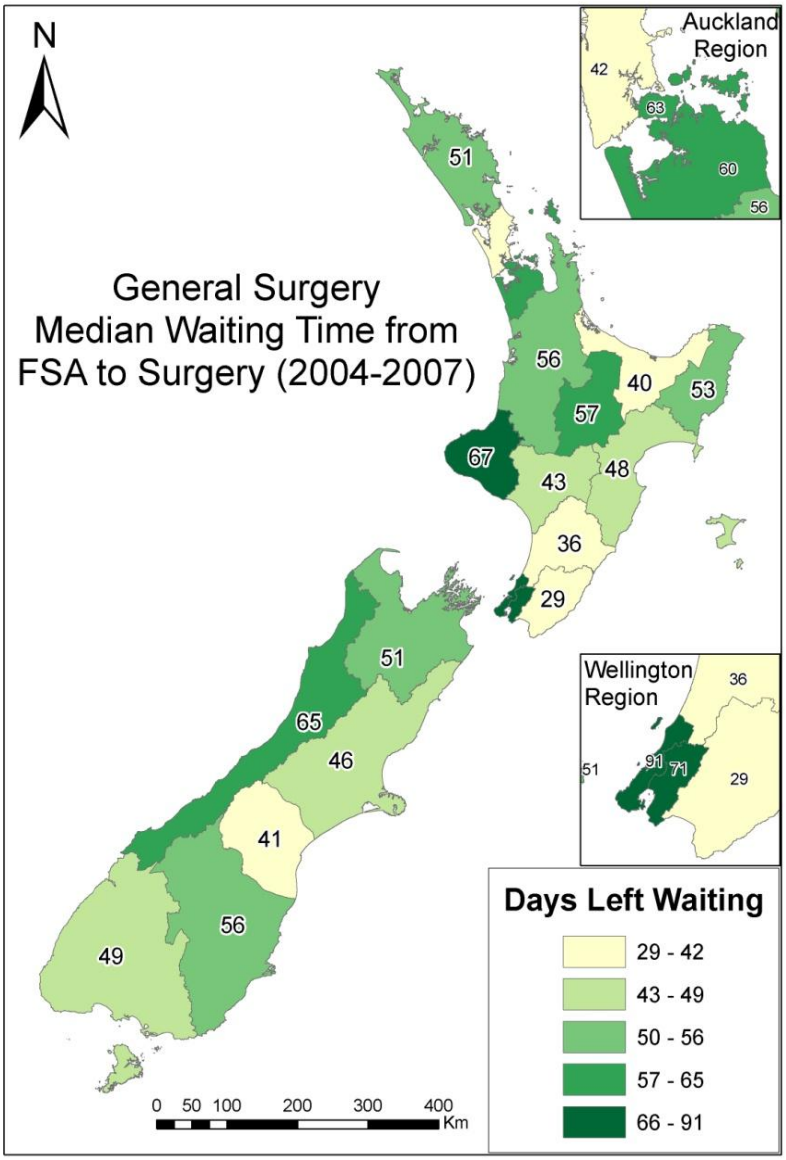


Figure 31: Median Waiting Time for General Surgery

Orthopaedic Surgery

Figure 32 shows the median wait time specifically for orthpaedic surgery procedures such as joint replacement, repair of bone fractures, tendon or ligament reconstruction and so on. As can be seen in Figure 32 Northland, Capital and Coast, Hutt Valley and Canterbury suffer the highest median waiting time while Mid Central, Auckland, Counties Manukau, Bay of Plenty, and Tairawhiti DHBs show median wait times at least three weeks less. This is not quite as extreme as in general surgery but still presents a significant difference in patient access to care depending on where they live.

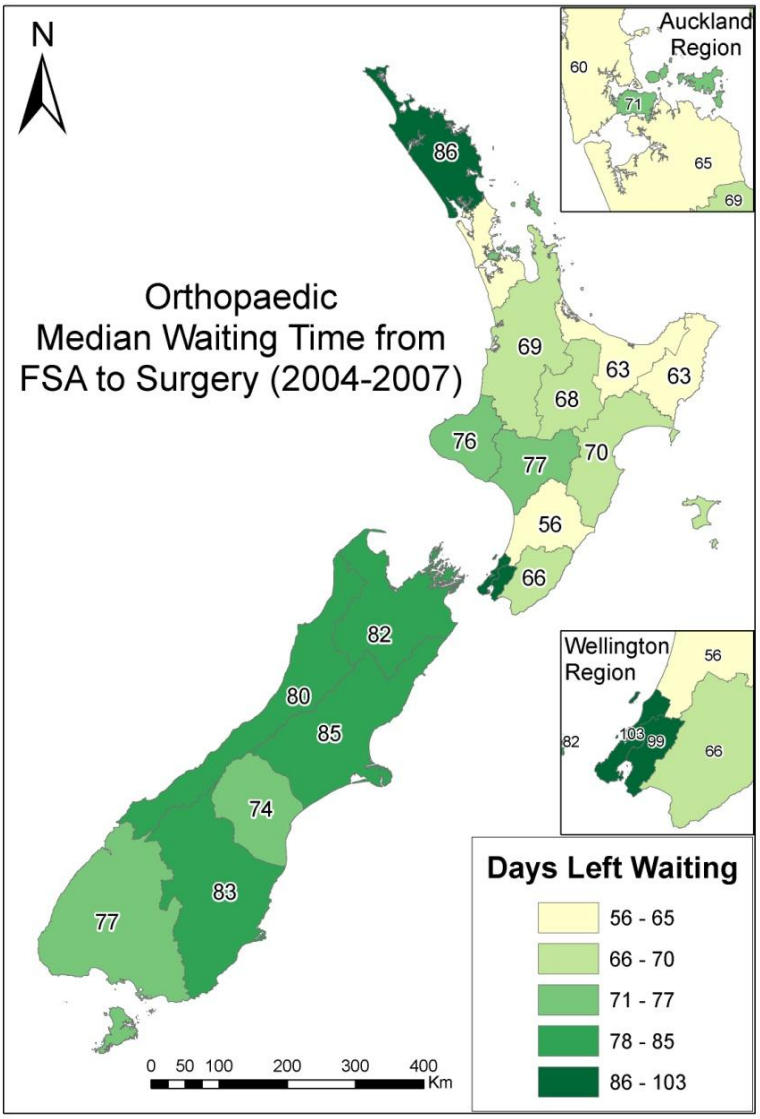


Figure 32: Median Waiting Time for Orthopaedic Surgery

Gynaecology

Figure 33 shows the median wait time for gynaecology during 2004 to 2007 for operations such as hysterectomy, laparoscopy and so on. As can be seen in Figure 33 Whanganui and Capital and Coast have by far the highest wait times whereas patients from Wairarapa and several others wait about half as long for treatment. Interestingly Whanganui which performs very well in the rest of the specialties has problems in the area of gynaecology. The difference between Whanganui and Wairarapa at the two extremes of waiting time is 60 days. This represents large differences in patients ability to access care depending on where they live.

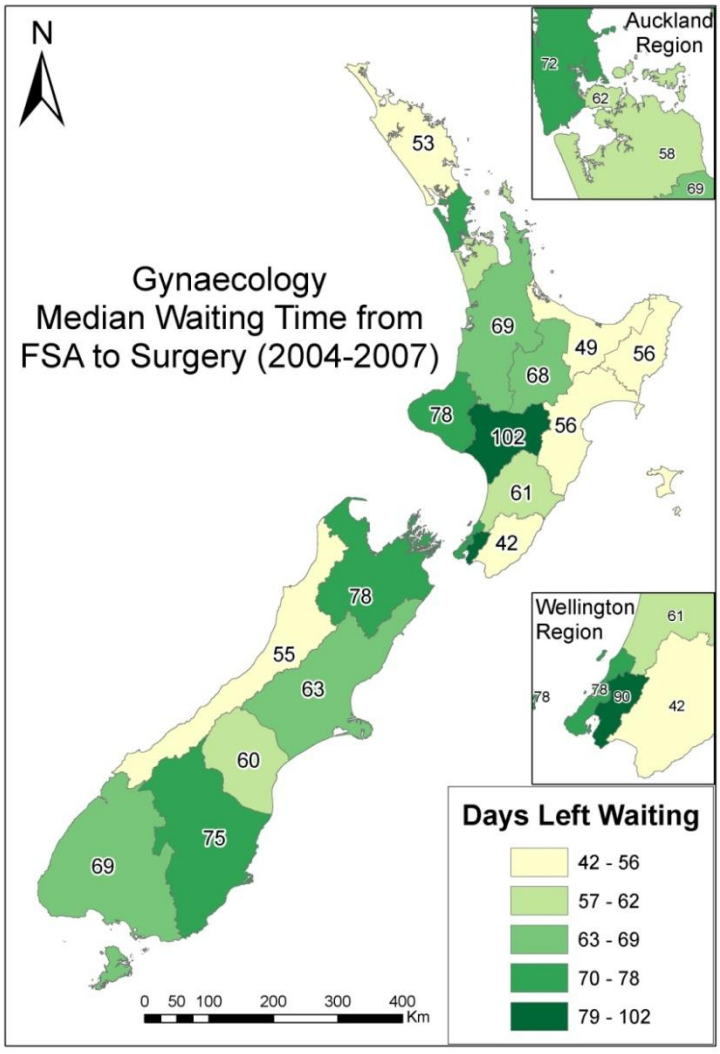


Figure 33: Median Waiting Time for Gynaecology Procedures

Ear, Nose and Throat

Figure 34 shows the median wait time for ear, nose and throat (ENT) surgery for operations such as tonsillectomy, sinus surgery, myringotomy and so on. As can be seen in Figure 34 Northland, Capital and Coast and West Coast DHBs all have extremely high waiting times for ENT procedures and the remainder all show extremely high geographic variation. North of Auckland the difference is most pronounced where patients living in Waitemata DHB are accessing care on average in 63 days while those in Northland DHB are on average only accessing treatment within 132 days, a differential of 69 days.

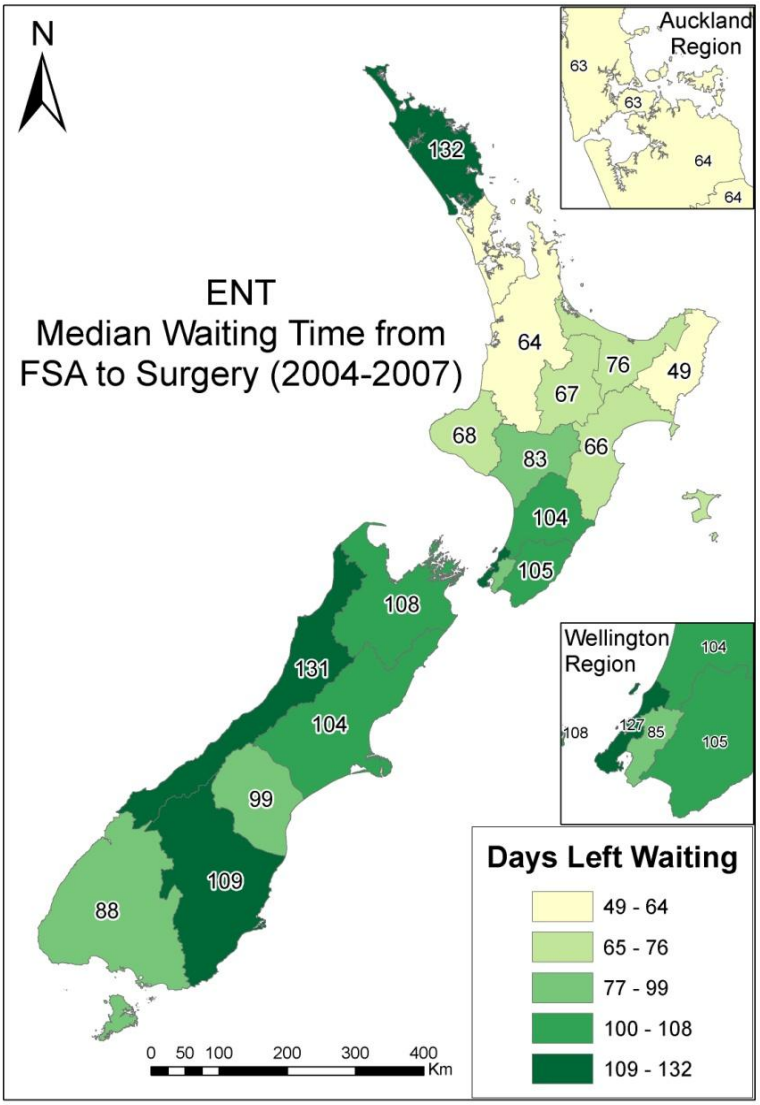


Figure 34: Median Waiting Time for Ear, Nose and Throat Procedures

Ophthalmology

Figure 35 shows the median waiting time for ophthalmology treatments such as cataract removal, laser eye surgery, and corneal surgery and so on over the period 2004 to 2007. As can be seen in Figure 35 Northland, Tairawhiti, Capital and Coast, Hutt Valley and Wairarapa DHBs have the largest wait times in New Zealand. Large differences present themselves around the central North Island where Mid Central boasts a median wait time of only 35 days while neighbouring DHBs: Whanganui, Hawkes Bay, Wairarapa, Hutt Valley and Capital and Coast all have wait times over 100 days, Capital and Coast the highest with 177 days over four times as long. This represents a major geographic inequity for patients' access to these services.

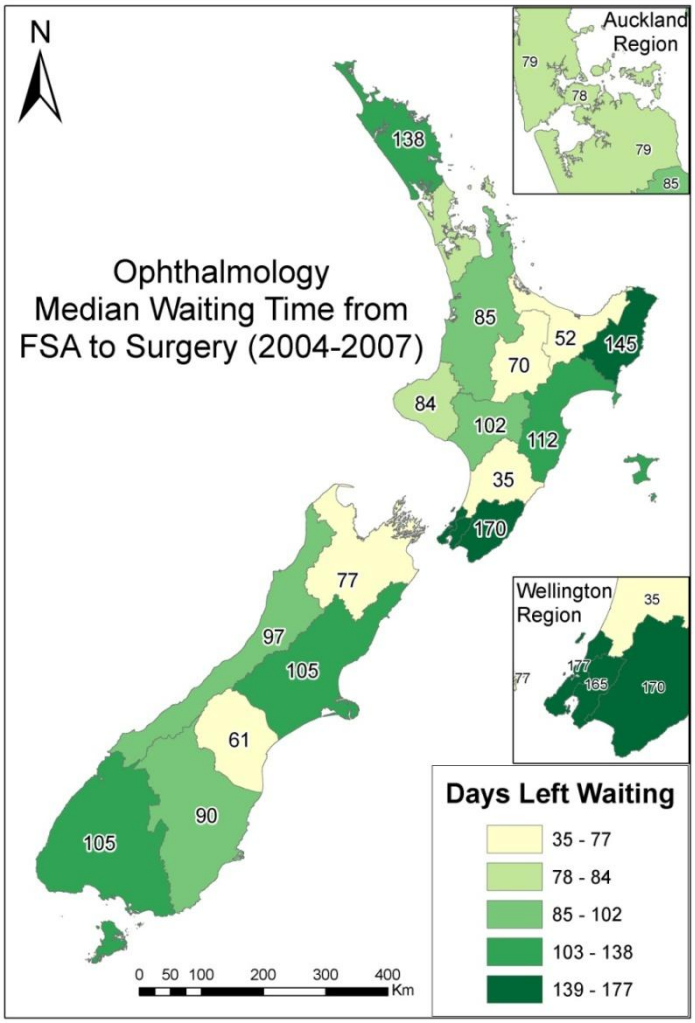


Figure 35: Median Waiting Time for Ophthalmology

6.3 Conclusion

In summary, results have shown major geographic and temporal variations by DHB over the study period. New Zealand results showed major differences in the length of time patients had to wait for treatment depending on where they live. A north-south gradient was observed in which patients were seen to wait longer the further south they resided. However, results showed that particular DHBs were performing particularly badly compared to the national average (Northland, Hutt Valley, Capital and Coast, and Canterbury), while others appear to be performing relatively well (Waitemata, Bay of Plenty, Tairawhiti, Whanganui and Wairarapa). It has been interesting to note that rural DHBs tend to be outperforming the urbanised DHBs which contain a large percentage of national hospital resources. The author has also compared the time patients have waited for surgery between 2004 and 2007 using equivalent results taken from Australia, and New Zealand patients were seen to be waiting longer for treatment than their Australian counterparts for similar types of surgery. Differences in waiting times were then depicted by specialty which inflated the geographic inequality between DHBs with regard to patients' access to timely elective treatments. Also, some specialties performed vastly better than others at providing efficient turnaround in waiting times. Overall this chapter has shown that major inequalities exist geographically for access to timely surgical intervention and that the speed of referral and treatment for publicly funded elective surgery certainly depends on the DHB in which you reside. The next chapter will investigate whether inequalities are apparent in waiting times for certain subsets of New Zealand's population particularly for lower socio-economic and ethnic minorities.

7 Socio-Demographic Variations in Public Waiting Times

7.1 Introduction

The previous chapter examined geographical trends in access to elective surgery in the public sector between 2004 and 2007. The next two chapters will offer further explanation for the differences in waiting times seen throughout Chapter 6. This chapter will examine whether different subsets of New Zealand's population suffer poor access to elective surgery relative to the remainder of the population. By looking at individual determinants of access such as age, gender, ethnicity, and socio-economic status the focus shifts from objective one to objective two. This represents a shift in focus away from the geographic analysis of each DHB as a whole to concentrate on issues of equality for individuals depending on their socio-demographic makeup and environment. These groups are being examined because it is understood that geographic variations in waiting times are influenced by the population characteristics contained within each DHB. Population characteristics are important as noted in Chapters 2, 3 and 4 as certain groups suffer higher morbidity than others, particularly the elderly, lower socio-economic groups, as well as Maori and Pacific Island communities. This may place extra burden on the hospital resources of these DHBs and thus patients may suffer extra-long waiting times, predominantly these high risk patients.

Initially the author will consider waiting times across the whole country broken down individual determinants such as age, sex, gender, ethnicity and deprivation to see whether differences in access are consistent across the entire booking system. Then analysis of ethnicity and deprivation will be further broken down by DHB to test whether there is contrasting access spatially across regions of New Zealand. The next section narrows the analysis to concentrate on waiting times by ethnicity, specifically differences between European and Maori/Pacific Island patients. Ethnic groups were aggregated to investigate whether Maori/ Pacific Island waiting times are better in DHBs where they comprise a larger proportion of the population or in those DHBs which have small ethnic communities.

7.2 Analysis of the Whole Dataset

Analysis will begin by re-examining the waiting times for New Zealand and the number of cases relevant in the NBRS dataset during 2004-2007. In Chapter 6 the author found that within the booking system there were 563 611 completed cases at a national median of 74

days waiting time from FSA to surgery date. Individual determinants of patient access will be investigated while concentrating on trends in New Zealand as a whole. The analysis will then differentiate waiting times by age, gender, ethnicity and deprivation before providing a further breakdown of group differences in waiting times by DHB.

Age

Figure 36 was created using results from Table 34 in Appendix 4. Figure 36 shows the relationship between age and average waiting times of patients by age group for all patients who entered and exited the booking system during 2004 to 2007 (see Table 34 in Appendix 4) The results depict low waiting times for patients between aged 0-14 followed by a sharp rise of an average of 12 days for the age group 15-24, steadily decreasing waiting times for those aged 15-45 years and consistent waiting times for patients over 45 years of age. This graph indicates that those most vulnerable patients who are at the beginning or end of their life span tend to get faster access to elective surgery.

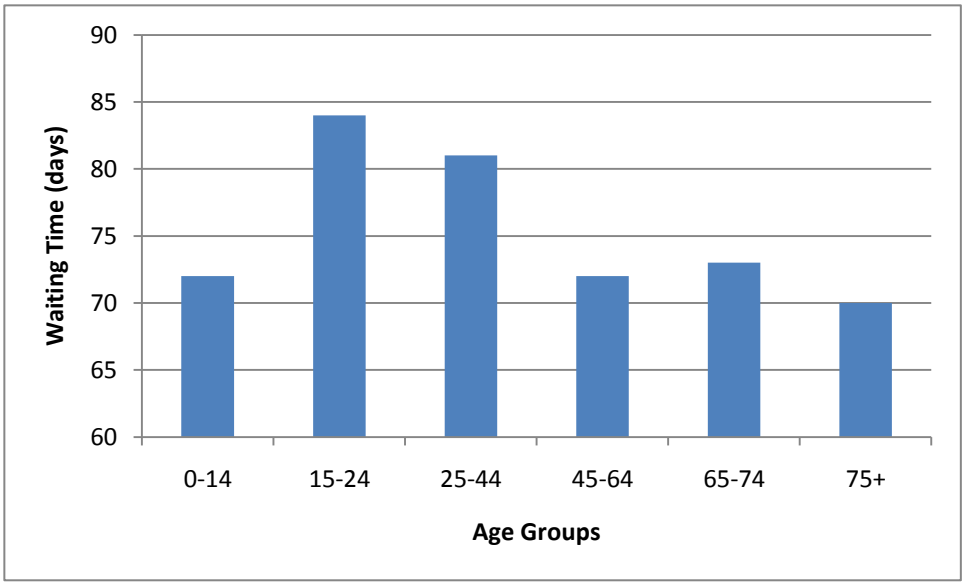


Figure 36: Median Waiting Time by Age Group 2004-2007

Gender

Table 17 shows average waiting times by gender throughout the whole country from 2004 to 2007. There is no conclusive evidence that nationally waiting times are determined by

gender as male patients have a higher mean by 3 days and women have a higher median by 1 day.

Gender	Mean	N	Std. Deviation	Median
F	148	312 046	219	74
M	151	251 552	224	73
Total (Excludes U's)	149	563 611	222	74

Table 17: Waiting Times by Gender 2004-2007

Ethnicity

Table 18 shows the median waiting time experienced by patients from five ethnic groups for the study period. These included European, Maori, Pacific Island, Asian and 'other' (representing all other ethnic groups reported in the booking system). There are differences in waiting time depending on ethnicity. Europeans have the lowest median waiting time of 72 days, five days less than the Maori equivalent, six days less than Pacific peoples and seven days less than of that for people of Asian descent. This is an interesting finding which will leads us to consider whether differences are more evident at the DHB administrative level.

Ethnicity	Cases	Mean	Std. Deviation	Median
European	423 924	149	224	72
Maori	69 815	153	221	77
Pacific Island	27 382	145	198	78
Asian	20 960	143	191	79
Other	21 530	156	226	77
Total	563 611	149	222	74

Table 18: Waiting Times by Ethnicity 2004-2007 (Days)

Deprivation

Table 19 and Table 20 break waiting times into measures of deprivation using the New Zealand Deprivation Index 2006. The results are displayed in deciles and quintiles respectively in each of the tables.

NZ Dep2006 (deciles)	Cases	Mean	Std. Deviation	Median
1 Very Low	31 939	149	226	74
2	39 505	144	219	69
3 Low	43 070	147	219	72
4	45 471	154	231	74
5 Medium	55 440	151	224	75
6	58 482	147	215	73
High	67 836	149	216	75
8	80 301	152	224	75
9 Very High	75 372	153	229	76
10	65 302	146	212	73
Total	563 611	149	222	74

Table 19: Waiting Times by Deprivation in Deciles 2004-2007 (Days)

NZ Dep 2006 (quintiles)	Cases	Mean	Std. Deviation	Median
1 Very Low	71 444	146	222	71
2 Low	88 541	150	225	73
3 Medium	113 922	149	220	74
4 High	148 137	150	221	75
5 Very High	140 674	150	221	74
Total	563 611	149	222	74

Table 20: Waiting Times by Deprivation in Quintiles 2004-2007 (Days)

Figure 37 illustrates the median waiting times depicted in Table 20. The range between least and most deprived when looking at waiting times is only 4 days which is not significant. However, higher socio-economic groups seem to have better access to care than those more deprived communities and differences become more substantial when waiting times are broken down by DHB.

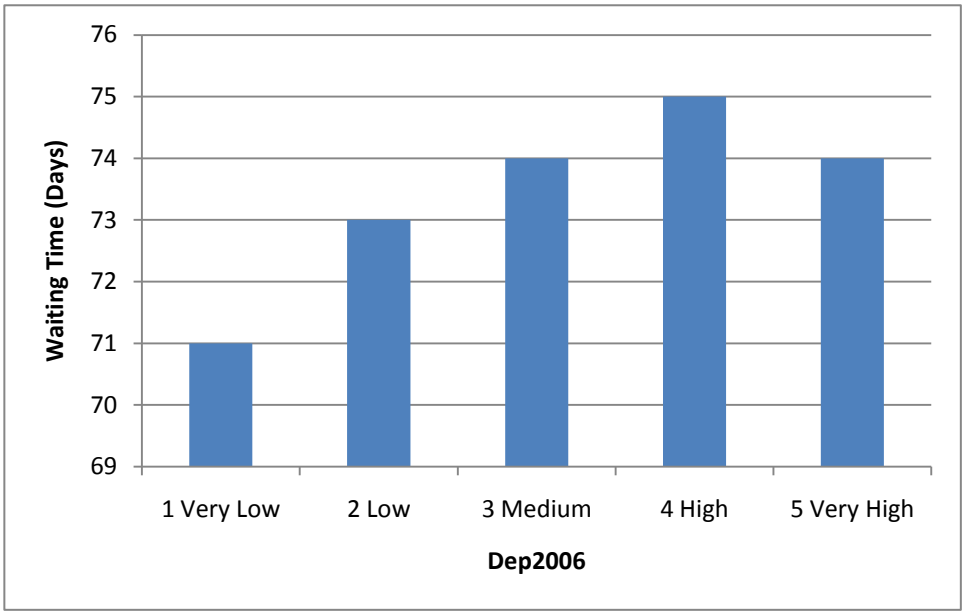


Figure 37: Median Waiting Time by Dep2006 in Quintiles (2004-2007)

7.3 Analysis by DHB

Before proceeding further it is important to take a brief look back at the results from Chapter 6 to see how average waiting times vary between DHBs. As can be observed in Table 21 medians in particular range between 60 and 103 days, a difference of 43 days. It will be interesting to note whether geographical difference is larger or smaller than individual determinants within each DHB. On that note, significant findings for each DHB have been demonstrated by breaking down waiting times by deprivation and ethnicity.

DHB	Cases	Mean	Std. Deviation	Median
Northland	29 027	169	236	86
Waitemata	52 838	120	171	60
Auckland	37 052	132	177	71
Counties Manukau	53 441	126	173	65
Waikato	31 667	142	209	69
Lakes	17 654	147	241	68
Bay of Plenty	40 432	137	211	63
Tairawhiti	9 153	156	271	63
Taranaki	30 301	164	241	76
Hawke's Bay	18 954	114	149	70
Whanganui	23 985	147	207	77
Mid Central	14 290	109	149	56
Hutt Valley	27 973	169	223	99
Capital and Coast	19 464	162	193	103
Wairarapa	7 793	123	162	66
Nelson Marlborough	28 403	170	250	82
West Coast	8 498	171	262	80
Canterbury	57 352	197	307	85
South Canterbury	11 641	152	235	74
Otago	27 702	145	190	83
Southland	15 187	180	286	77
New Zealand	563 611	149	222	74

Table 21: Average Waiting Times by DHB 2004-2007

Figure 38 depicts median waiting by NZ Dep 2006 for quintile groups one and five broken down by DHB (For further detail see Appendix 5, Table 35.). The median waiting times for those in the most highly deprived areas and the least deprived areas were used to create a bar graph which shows quite clearly that, with the exception of the Bay of Plenty and Southland DHBs, deprived communities wait longer for treatment.. However, the range between highly deprived and well off communities varies geographically. For example, in Hutt Valley DHB the range in median waiting times between the highest and lowest deprivation communities is 18 days compared to only 1 day in Lakes DHB. So not only are inequalities in waiting times determined by deprivation but the levels of inequality vary depending on the DHB in which a patient resides. However, regression analysis indicated that in only seven DHBs (Waitemata, Auckland, Counties Manukau, Hawkes Bay, Hutt Valley, Canterbury and Otago) was there a statistically significant relationship between waiting time and deprivation

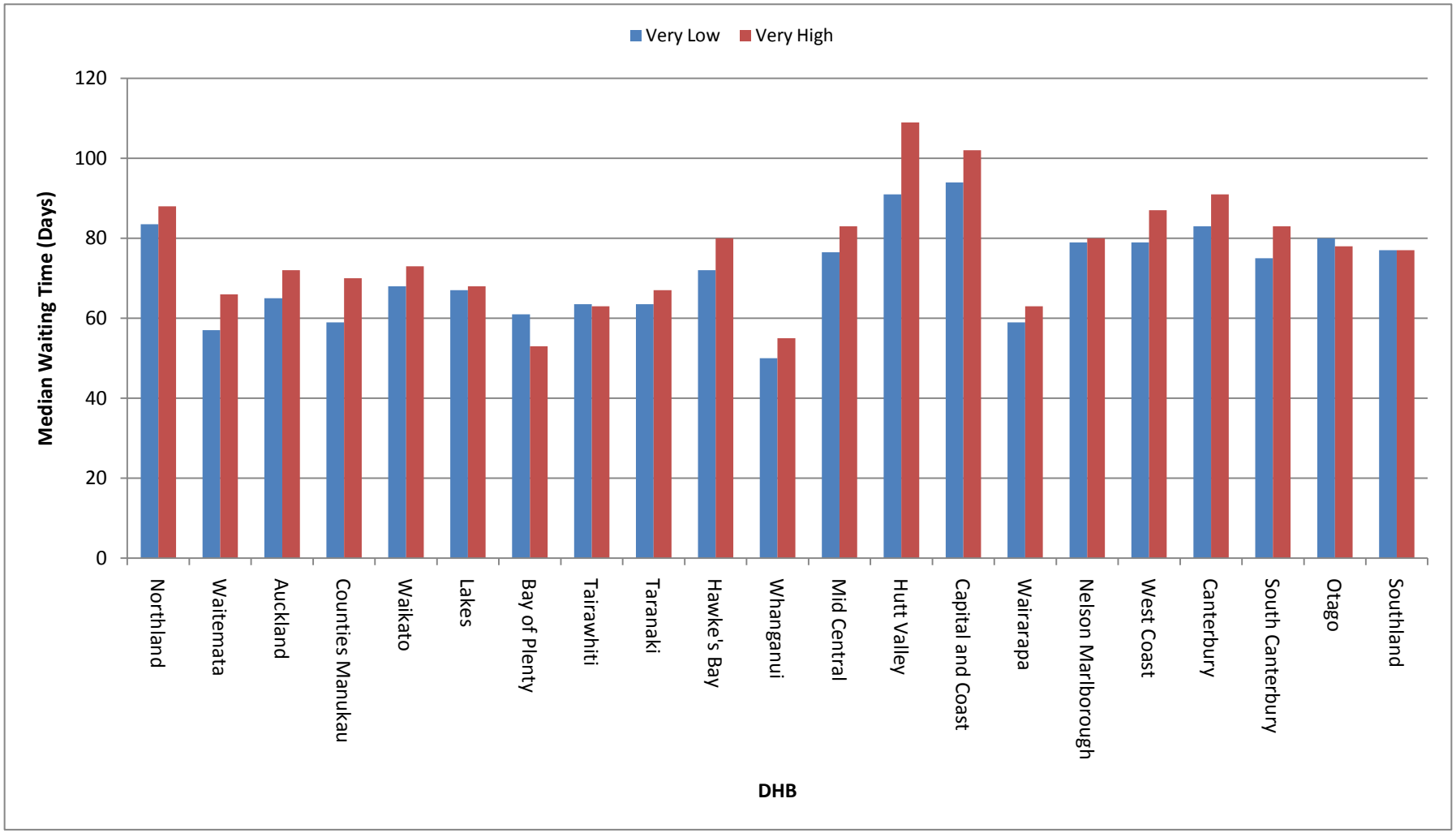


Figure 38: Median Waiting Time by Dep2006 Quintile Groups 1 and 5 (2004-2007)

Ethnicity

Table 22 shows the results when median waiting times were broken down by ethnicity. Figure 39 illustrates the information from Table 22 in the form of a bar graph showing the differences between differing ethnic groups' experiences waiting for treatment in each of New Zealand's 21 DHBs. Other ethnicities were excluded from the graph because they seemed to show little trend and provide meaningless results. For this reason the preceding discussion focused on New Zealand's four major ethnic groups.

Ethnicity	European	Maori	Pacific	Asian	Other	Total
Northland	83	96	90	78	87	86
Waitemata	57	67	69	69	63	60
Auckland	68	71	71	78	88	71
Counties Manukau	58	71	77	73	68	65
Waikato	67	79	70	69	76	69
Lakes	65	73	64	66	76	68
Bay of Plenty	63	62	70	67	63	63
Tairawhiti	60	69	76	51	80	63
Taranaki	70	71	68	72	55	70
Hawke's Bay	76	77	69	92	78	76
Whanganui	56	57	41	53	74	56
Mid Central	76	85	94	96	79	77
Hutt Valley	100	105	125	118	104	103
Capital and Coast	97	100	104	117	112	99
Wairarapa	66	67	36	79	61	66
Nelson Marlborough	81	95	92	88	66	82
West Coast	80	79	118	91	94	80
Canterbury	84	90	95	83	99	85
South Canterbury	72	88	79	69	89	74
Otago	81	105	118	85	96	83
Southland	77	75	73	78	65	77
New Zealand	72	77	78	79	77	74

Table 22: Median Waiting Times by Ethnicity 2004-2007 (Days)

In Figure 39 the European median waiting time is consistently and often significantly lower than other than for other ethnicities with the exception of Tairawhiti and South Canterbury DHBs where Asian patients are better off and Hawkes Bay, Whanganui and Wairarapa where Pacific populations are better off. In all other DHBs European patients are better off, in some cases vastly better off. For example in the West Coast and Otago patients of Pacific Island descent wait over 35 days longer than their European counterparts. With regard to Maori patients, with the exception of Bay of Plenty, West Coast and Southland DHBs, they consistently average around 5 to 10 days longer wait than European patients. Pacific Islanders' results vary considerably between DHBs. For example, in the Hutt Valley patients have a median waiting time of 125 days, whereas the neighbouring Wairarapa DHB has a median waiting time of 35 days, a difference of 90 days. Asian patients in most DHBs experience higher waiting times than Europeans with the exception of Northland, Tairawhiti, Whanganui, Canterbury and South Canterbury DHBs. In brief there are two major trends showing in these results:

- Europeans experience shorter waiting times than any other ethnic group, although this result varies geographically.
- Inequalities in patient waiting times are enlarged when considering patients' ethnicity.

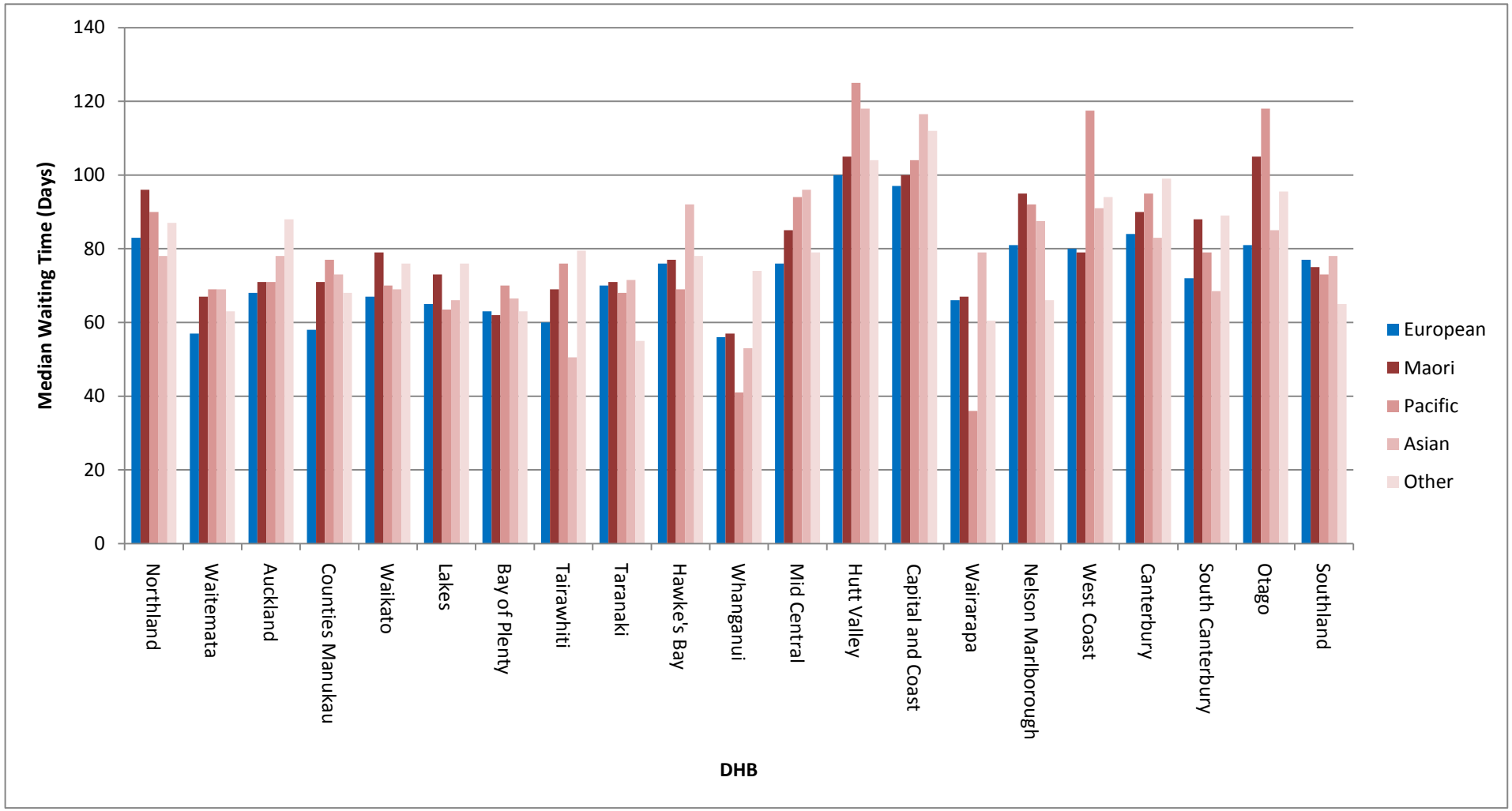


Figure 39: Median Waiting Times by Ethnicity 2004-2007

7.4 Ethnicity and Waiting Time in The New Zealand Booking System (NZBS)

The previous analysis indicates that waiting times vary by both deprivation and ethnicity. Ethnicity seems to be the stronger of the two effects in particular the gradient between European to Maori/Pacific Island, and Asian waiting times. Since Maori and Pacific issues concerning access to elective surgery are frequently commented on in the literature in Chapters 3 and 4, differences between European and Maori/Pacific Island populations are explored here in more detail. The next section of the chapter compares these two subsets of New Zealand's population against age, deprivation and gender in relation to waiting times. Following this, the effects of ethnicity are examined in the five DHBs with the highest Maori and Pacific Island populations and the five DHBs with the highest European population. This will reveal whether or not the waiting times of Maori and Pacific Islanders are shorter in areas where they comprise a significant portion of the population compared to those DHBs in which Maori and Pacific populations fall into the minority. This may identify a need for better strategies to target Maori and Pacific Island needs in areas in areas with high concentrations of these ethnic groups.

Ethnicity and Age

Age Groups	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
0-14	75	69	38 309	22 687
15-24	85	79	19 578	7 064
25-44	79	84	68 068	25 721
45-64	70	78	111 832	27 079
65-74	71	85	80 933	10 215
75+	69	90	105204	4431
Total	72	77	423924	97197

Table 23: European and Maori/Pacific Median Waiting Times by Age Group 2004-2007

Table 23 shows waiting times and the number of European patients compared to Maori and Pacific Island patients in each age group. Figure 40 displays the results on a bar graph with a blue line representing European median waiting times and the red line indicating the Maori and Pacific Island median waiting times. This graph shows that during younger ages European people tend to wait longer than Maori and Pacific Island patients but sometime around the early 20s i.e., the 15-24 age group, this trend reverses and Maori and Pacific Island patients become worse off. Also as Maori and Pacific populations age waiting times tend to increase whereas European waiting times remain stable.

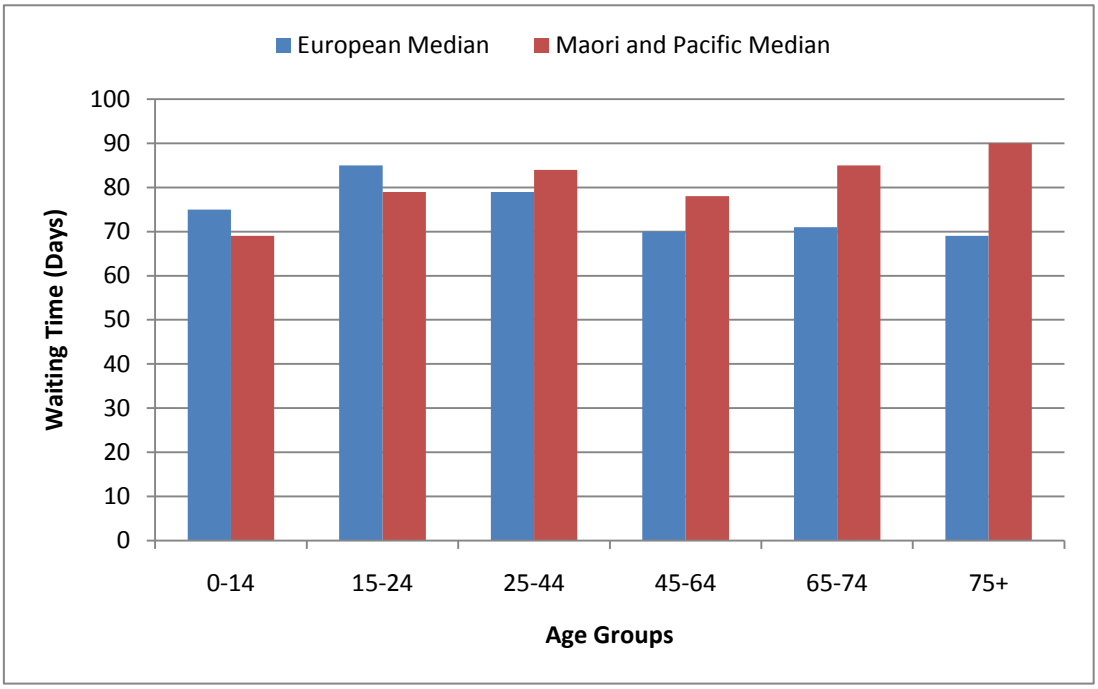


Figure 40: European and Maori/Pacific Median Waiting Times by Age Groups 2004-2007

Ethnicity and Deprivation

Table 24 shows national results for each ethnic group and, as indicated previously, it is evident that deprivation does not play a significant factor in the time that New Zealand patients wait for elective surgery. However, variation by ethnic group remains in each NZ Dep 2006.

	Very Low	Low	Medium	High	Very High
European	72.00	72.00	73.00	74.00	71.00
Maori	77.00	79.00	78.00	78.00	76.00
Pacific	78.00	75.00	76.00	75.00	79.00
Asian	79.00	77.00	80.00	79.00	78.00
Other	77.00	77.00	76.00	79.00	78.00
Total	74.00	73.00	74.00	75.00	74.00

Table 24: Median Waiting times by NZ Dep 2006 Quintile when Compared Against Ethnicity

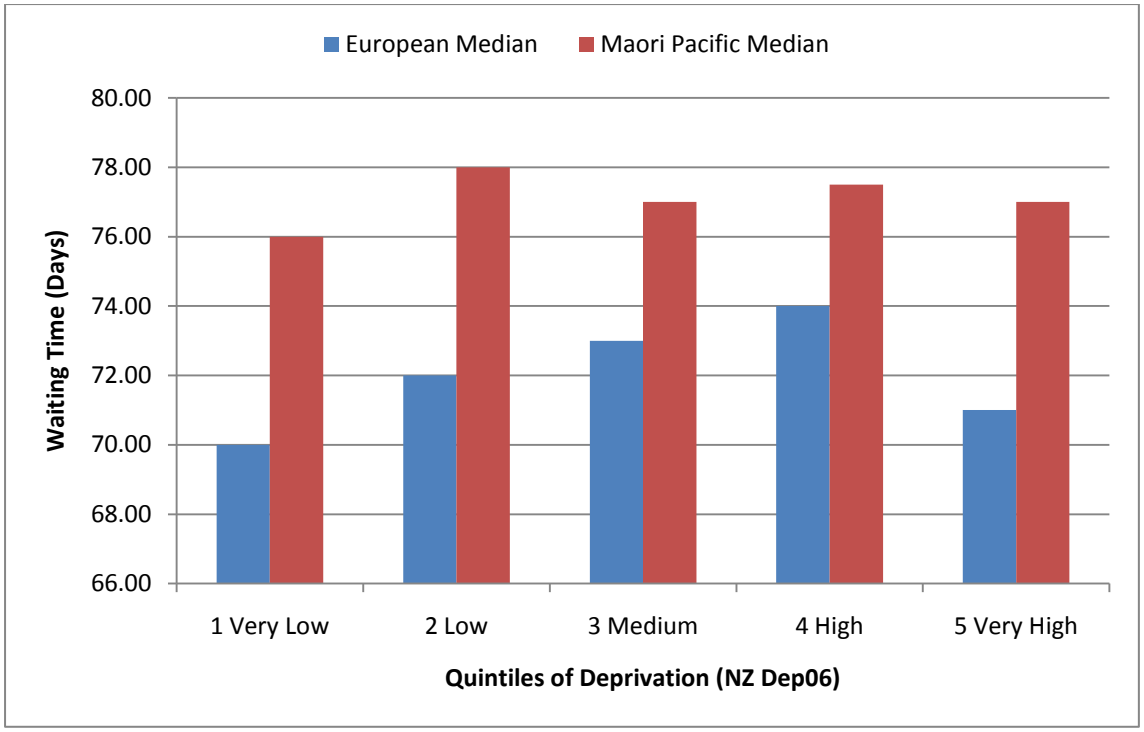


Figure 41: Median Waiting Times by Ethnicity and Dep2006 in New Zealand over 2004-2007

Table 36 (Appendix 6) shows European and Maori Pacific waiting times broken into quintiles indicating levels of deprivation and shows a similar trend for both Maori Pacific and European patients. Results again show more of an ethnic difference between Maori/Pacific and European with an average of just over five days difference between the groups.

Because there appears to be such a significant ethnic difference analysis was undertaken of waiting times in the five DHBs with the highest and lowest proportions of Maori and Pacific Islanders in order to determine whether ethnic differences in waiting times were exaggerated in these DHBs. Ethnic concentrations are important as some ethnic groups have lower overall health status and place greater demands on the health system. This was seen throughout Chapters 2 to 4, and in New Zealand specifically related to levels of morbidity in Maori and Pacific populations. The five highest and five lowest DHB populations of Maori and Pacific Islanders proportionate to Europeans are shown in Table 25.

DHB	% Maori-Pacific	N (Maori-Pacific)	N (European)
Tairawhiti	47	21,057	22,662
Counties Manukau	37	160,230	193,446
Lakes	36	35,031	59,043
Northland	32	47,229	93,336
Hawkes Bay	26	39,174	98,028

DHB	% European	N (European)	N (Maori-Pacific)
South Canterbury	79	42,555	3,606
Nelson Marlborough	78	101,238	12,639
Wairarapa	77	29,769	6,342
West Coast	77	24,024	3,198
Southland	76	80,886	12,903

Table 25: DHBs With the Highest and Lowest Proportion of Maori and Pacific Islanders to Europeans

In the next section of results the top two DHBs from Table 25 will be analysed to see whether ethnic differences in waiting time increase in accordance with deprivation at the DHB level.

Tairawhiti DHB

Tairawhiti DHB has the highest proportion of Maori and Pacific Islanders to European residents. Figure which displays these results shows that waiting times for Europeans are double the length of Maori and Pacific patients for least deprived residents but in all other levels of deprivation Europeans are waiting up to 18 days less than Maori Pacific patients. For more detail see Appendix 6 - Table 39.

Counties Manukau DHB

Counties Manukau DHB has the second highest proportion of Maori and Pacific Islanders to European residents. Figure 43 clearly shows that in Counties Manukau DHB, at every level of deprivation Maori and Pacific patients are waiting longer for treatment at an average of 16 days more than European patients. For further detail see Appendix 6 – Table 40.

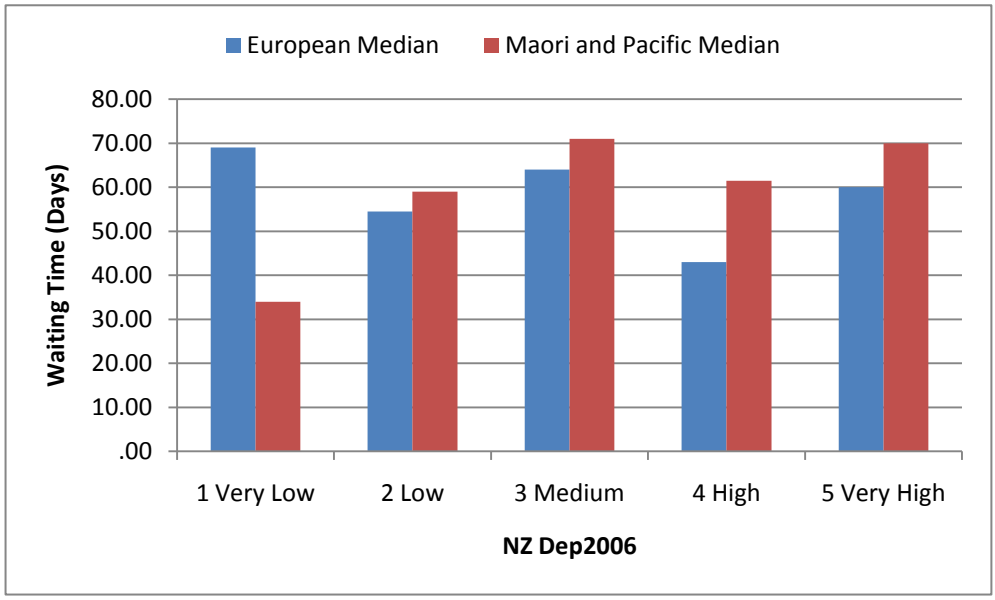


Figure 42: Median Waiting Times by Ethnicity and Dep2006 in Tairawhiti over 2004-2007

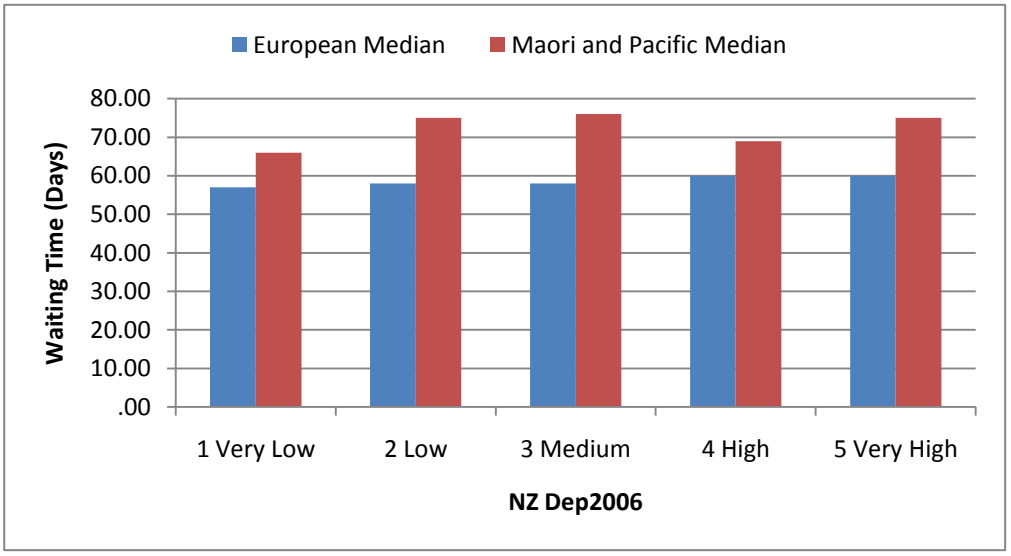


Figure 43: Median Waiting Times by Ethnicity and Dep2006 in Counties Manukau over 2004-2007

South Canterbury

South Canterbury DHB has the lowest proportion of Maori and Pacific Islanders to European residents. Figure 44 shows that, apart from the least deprived communities, Maori and Pacific patients were waiting longer than European patients by an average of 13 extra days. Appendix 6 – Table 41 provides more detail.

Nelson Marlborough

Nelson Marlborough DHB has the second lowest proportion of Maori and Pacific Islanders to European residents. Figure 45 shows that in Nelson Marlborough Maori and Pacific Island patients wait longer for treatment than European patients by an average of 13 days. For further detail see Appendix 6 – Table 42.

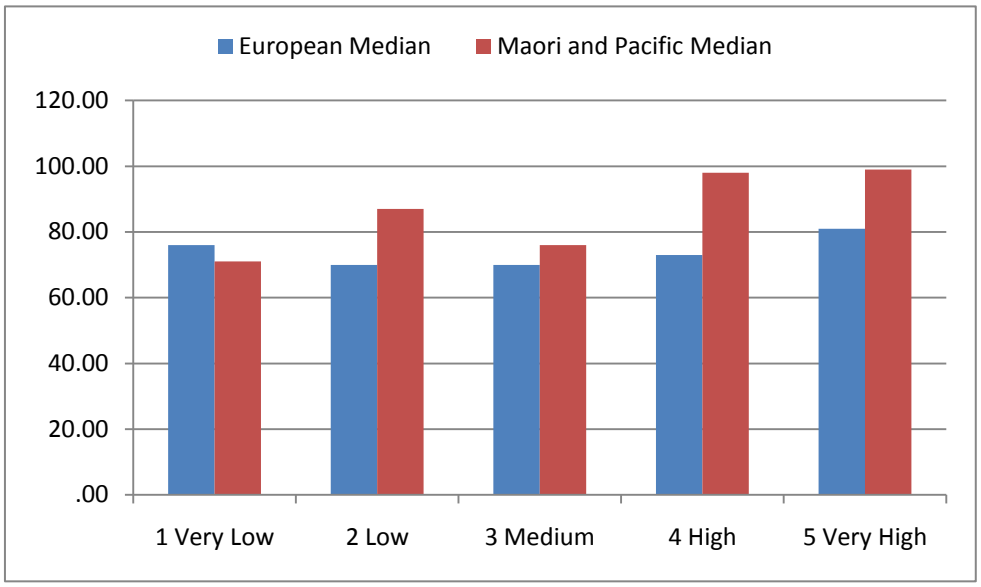


Figure 44: Median Waiting Times by Ethnicity and Dep2006 in South Canterbury over 2004-2007

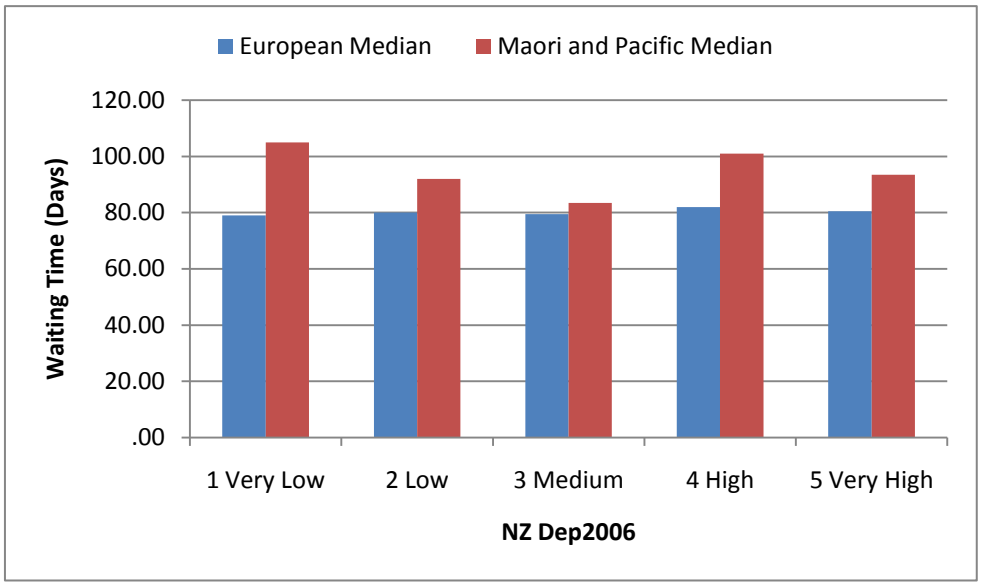


Figure 45: Median Waiting Times by Ethnicity and Dep2006 in Nelson Marlborough over 2004-2007

In each of these four DHBs graphs are not suggesting very much of a trend for deprivation but are showing up clearly that Maori and Pacific Islanders are waiting longer for treatment.

Gender Differences in Waiting Times

In this next section of the chapter gender issues will be discussed in relation to ethnicity. Figure 46 depicts the analysis of the results from Table 43 to Table 48 in Appendix 7. The left hand graph shows European differences of waiting time for male to female patients and the graph on the right shows the Maori and Pacific Island equivalents. The European waiting times differential of between genders is the strongest in Tairawhiti and Wairarapa DHBs at eight and nine days respectively. For Maori and Pacific Island patients though the difference is much greater, especially in DHBs with the least Maori and Pacific Islanders relative to Europeans. The difference is greatest in Nelson Marlborough and Wairarapa DHBs where men waited 16 and 20 days more than females for treatment.

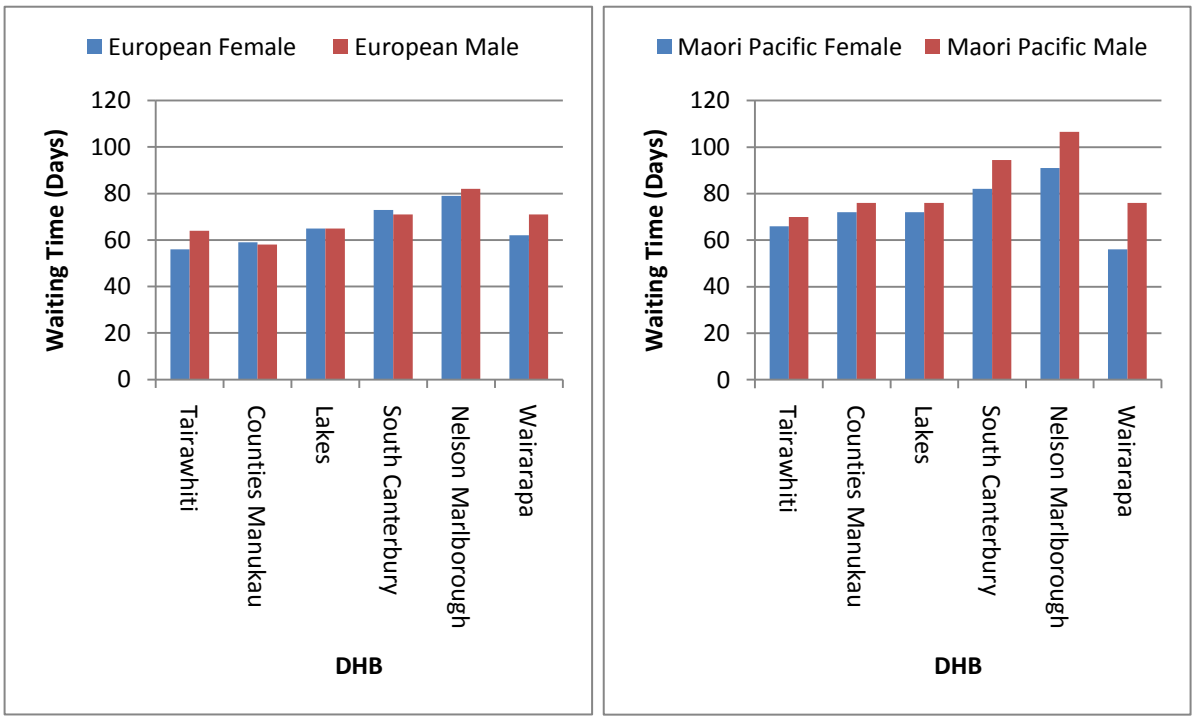


Figure 46: Median Waiting Time by Gender, European versus Maori/Pacific Populations

7.5 Conclusion

In conclusion we have found that waiting times over the 2004-2007 period varied considerably when considering individual patient determinants such as age, gender, ethnicity, and deprivation. The most significant determinants of access to publicly funded elective surgery were ethnicity and deprivation. In most cases minority populations tend to wait longer than the European majority within the New Zealand population, particularly Maori and Pacific Island peoples. This ethnic difference varied significantly by DHB with some areas showing little difference in wait times while others show a large disparity in access between ethnic groups. The deprivation effect means that patients from lower socio-economic areas wait longer than those in affluent areas.

The author found that when measuring ethnicity and deprivation, differences were more pronounced in some DHBs than others and a few DHBs showed the opposite trends emerging. However, ethnicity was shown to be a far greater influence on waiting times than deprivation. After calculating ethnic concentrations few differences in waiting times arose between DHBs with large or very small communities of Maori and Pacific population. Gender effects did not show up in waiting times unless ethnicity was also considered in which case Maori and Pacific Island men wait up to 20% longer than females as compared to European patients. Chapter 8 will examine environmental factors that may influence waiting times in the public hospital system. This will investigate whether urban rural factors play a part in access to elective surgery and also acknowledge the part the private hospital sector plays in the provision of elective procedures and the impact this has on waiting lists within the public booking system.

8 Contextual Factors Leading to Variation in Waiting Times

8.1 Introduction

The last two chapters have looked at geographic, temporal and individual factors determining New Zealanders access to public hospitals, in particular for elective services. Chapter 8 will consider the environmental factors that play a part in the equitable allocation of hospital services throughout New Zealand. This chapter will set out to meet objective three using four main aims. The first aim was to look for differences that are present in the waiting time of patients whether they reside in an urban centre or in a rural location. This is important to measure since we saw in Chapter 6 that highly urbanised DHBs such as Capital and Coast or Canterbury had longer waiting times than DHBs that are more distant from major cities such as Whanganui, Tairawhiti or Wairarapa. Secondly, admission rates will be examined to find differences of public/private practice and the level of certain socio-economic inequalities affecting hospital access. Thirdly, admission rates will be considered in conjunction with the public waiting time results found throughout Chapters 6 and 7 to see whether private practice influences the performance of the public sector in delivering equitable hospital services. This is a very important and widely contested question that may give some explanation behind the regional variation in waiting times.

To begin with the chapter examines the way the level of urban or rural influence plays a part in determining patient waits in the NZBS. The analysis then examines the NMDS admissions data at first by discussing the variances in the public versus private admissions rates over the years 2004-2007. Age standardised admission rates are calculated and results are discussed by DHB, public versus private practice and the admissions of lower socio-economic communities in each of the DHBs. Admissions results are then related back to waiting times results to see whether there is a relationship between hospital admission rates and waiting times. Finally, private hospital admissions are calculated for Maori and Pacific populations versus the European population and highly deprived versus least deprived populations, these are then correlated with the waiting times experienced by these groups in each DHB to see whether relationships are more apparent when taking ethnicity and deprivation into account.

8.2 Urban-Rural Influence

Most of the comprehensive hospital facilities and specialist services that deliver elective surgery are clustered in and around in the major city centres. Figure 62, Figure 63 and Figure 64 in Appendix 9 show the location of public and private hospitals in New Zealand's three major metropolitan cities. In the Auckland region Middlemore, Auckland and North Shore hospitals are the three major public hospitals which service the region, plus a number of smaller public and private hospitals located in close proximity. In Wellington the main public facilities are at Keneperu, Hutt and Wellington Regional Hospital while a number of private facilities are also located nearby. Christchurch has a similar pattern with the three major public facilities in Burwood, Christchurch and Princess Margaret Hospitals. Several private institutions are located near Christchurch Hospital. The reasons behind the urbanisation of hospital services were discussed in Chapters 2 and 3, in brief, this occurs in the understanding that larger facilities produce efficiencies that a large network of small hospitals cannot provide. The reason private hospitals are located near the large public hospitals is partly so the specialists can work in both sectors and have access to university facilities which also tend to be located close to public hospitals. In addition, private hospitals are in urban centres where the majority of health insurance ownership is located so, in the case that something goes wrong, the private hospital can ensure a fast transfer of patients to public emergency facilities and intensive care.

In Chapter 6 the results suggested that waiting times for publicly funded surgery administered under the NZBS were shorter in less urbanised DHBs such as Whanganui and Wairarapa and longer in DHBs based around large city centres like Capital and Coast and Canterbury DHBs. This may be partly because in DHBs where comprehensive hospital facilities are nearby and readily available for use there tends to be greater demand for hospital care, as determined by Roemer's Law (Roemer, 1961), which states in general that as the hospital bed supply increases so does demand for those beds. (See earlier discussion in Chapters 2 and 3). This may be the reason why Hutt Valley, Capital and Coast and Canterbury perform so badly when it comes to providing access to elective surgical procedures. In areas of low demand DHBs have the luxury of providing shorter waiting times and better access to surgery. Also, because there is less demand the DHB can afford to purchase more services from the private hospital sector. Since the analysis that was undertaken in Chapter 6 only allowed results at the DHB level it may be useful to break

patients' access down by their residence to investigate whether urban patients really do wait longer than their rural counterparts.

Table 26 displays average waiting times broken down by residence, this gives an indication of whether or not proximity to urban amenities including the most comprehensive hospital services matters when considering access to treatment. This measure is complicated by the fact that the New Zealand health system is broken down into many administrative units. As found in Chapter 6, waiting times varied considerably between DHBs given the fact that some DHBs are vastly more urbanised than others. However, each DHB contains a mixture of communities some of which may live in cities while others live in isolated farming communities. By using an urban-rural indicator to measure individual patient access to elective treatments the author is able to see whether the results found in Chapter 6 really relate to the level of urban amenities, including hospital services, that are available locally to the patient.

Urban Rural	Cases	Mean	Std. Deviation	Median
Main Urban	383 763	149	218	74
Secondary Urban	52 790	146	226	69
Minor Urban	62 428	151	223	75
Rural Centre	14 566	160	239	77
Other Rural	49 103	154	232	75
Total	562 650	149	222	74

Table 26: Waiting Times by Urban-Rural Influence for 2004-2007 (Days)

Table 26 shows that there is some relationship between waiting time and urban-rural residence. Main urban areas tend to have higher waiting times than secondary urban areas then, as amenities decrease for minor urban areas and rural areas, waiting times tend to increase. However, there is very little difference between the time waited by patients from main urban centres and rural areas.

Ethnicity and Urban Rural Profile

Table 37 – Appendix 6 shows European and Maori Pacific waiting times broken into a measure of urban rural profile. The table also shows how many patients came from each classification in each ethnic group within the Urban Rural Profile. Figure 47 displays the results from Table 37. Figure 47 is a bar graph with a blue bar representing European

median waiting times and the red indicating the Maori and Pacific Island median waiting times within the urban-rural profile. Both lines show a similar trend with the exception of 'main urban' and 'other rural' areas where longer waiting times are experienced by Maori/Pacific patients are experienced by European patients. Because the Maori and Pacific Island line lies above the European line it exhibits more of an ethnic difference than a difference by urban-rural profile. There is an average gap of four days between the waiting times of Europeans and Maori/Pacific patients.

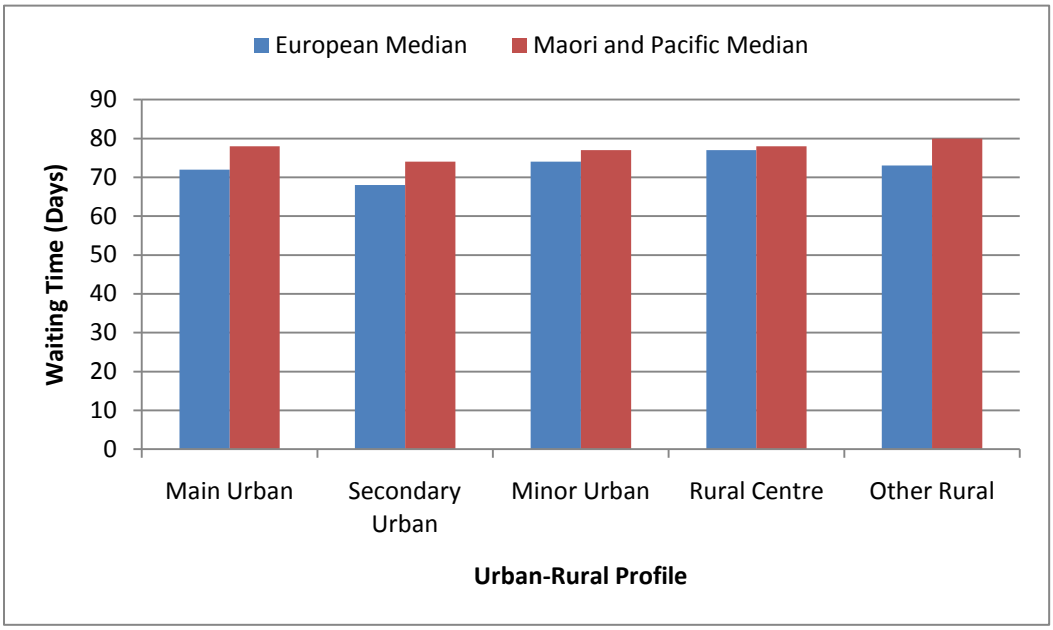


Figure 47: Median Waiting Times by Ethnicity and Urban-Rural Classification in New Zealand over 2004-2007

Deprivation and Urban Rural Profile

Figure 48 displays results taken from Table 38 attached in Appendix 6 which shows waiting times of patients that reside in areas of very low or very high deprivation broken into a measure of urban rural profile. It also shows how many patients came from each classification by NZ Dep 2006 quintiles one and five, within the urban-rural profile. The bar graph has a blue bar representing patients from very low deprivation areas and a red bar for patients that come from very high deprivation areas. Highly deprived patients suffer higher waiting times in Main Urban centres and isolated rural communities but results show that they receive treatment faster than less deprived patients in Secondary Urban, Minor Urban areas and Rural Centre, with median differences up to 7 days.

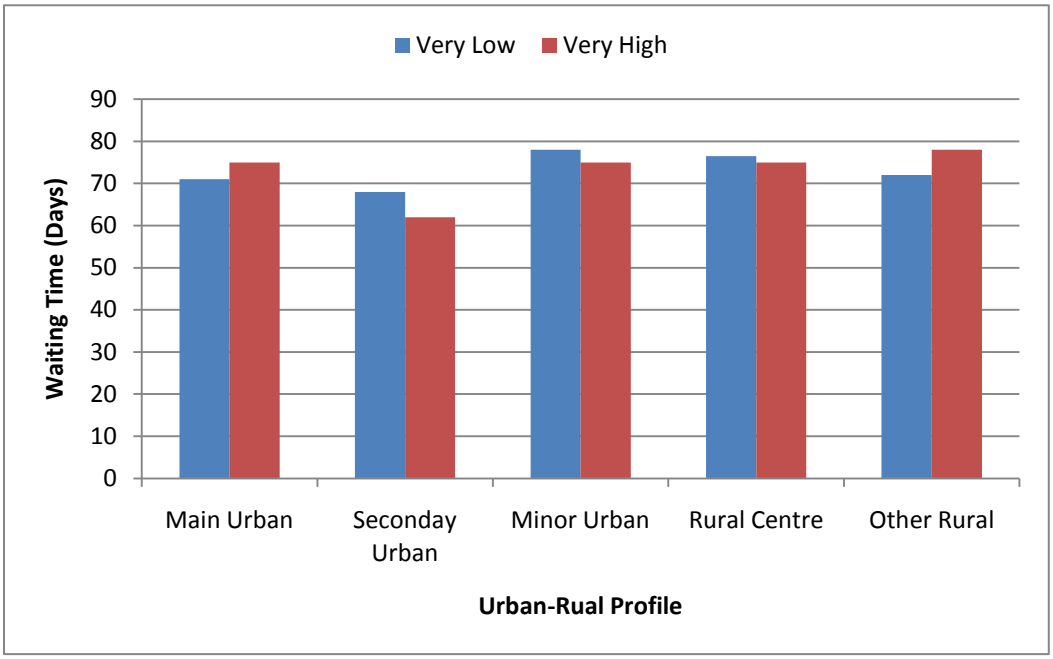


Figure 48: Median Waiting Times by NZ Dep 06 Quintiles 1 & 5 and Urban-Rural Classification in New Zealand between 2004-2007

Overall, urban-rural factors did not show a clear relationship that patients wait longer in urbanised areas as suggested in the results in Chapter 6. Nor did they suggest that waiting times varied by urban-rural classification when taking into account ethnicity and deprivation factors.

8.3 New Zealand Hospital Admissions and Waiting Time

8.3.1 Public and Private Hospital Admissions 2004-2007

Table 27 displays results from the NMDS public and private admissions data that are age standardised for each DHB. Public and private admission rates are given per 1000 people over the 2004-2007 period for the whole New Zealand population. This includes a ratio of every public to private admission per DHB. The same information has been produced for individuals in NZ Dep 2006 groups 8, 9 and 10. Significant results were found between public and private admissions in each DHB between the admissions for the total New Zealand population and admissions of highly deprived communities.

District Health Board (DHB)	Age Standardized Rate per 1000 people (95% CI)		Ratio: (Public:Private)	Age Standardized Rate per 1000 people (95% CI) In NZDep 2006 groups 8, 9 and 10		Ratio: (Public:Private)
	Public Surgery	Private Surgery		Public Surgery	Private Surgery	
Northland	188.8 (186.7, 191.0)	78.1 (77.7, 78.5)	2.4	195.0 (192.2, 197.8)	74.8 (74.3, 75.3)	2.6
Waitemata	149.2 (148.1, 150.3)	59.7 (59.5, 59.9)	2.5	143.7 (140.9, 146.4)	29.2 (29.0, 29.4)	4.9
Auckland	107.7 (106.7, 108.8)	55.6 (55.5, 55.8)	1.9	77.9 (76.4, 79.4)	26.5 (26.4, 26.7)	2.9
Counties Manukau	167.9 (166.7, 169.2)	35.2 (35.1, 35.3)	4.8	46.2 (76.4, 79.4)	21.3 (21.2, 21.4)	2.2
Waikato	152.4 (151.1, 153.7)	91.6 (91.2, 91.9)	1.7	166.8 (164.5, 169.1)	74.9 (74.5, 75.3)	2.2
Lakes	185.4 (182.7, 188.1)	94.5 (94.0, 95.1)	2.0	169.4 (165.9, 172.8)	69.6 (69.0, 70.2)	2.4
Bay of Plenty	196.0 (194.2, 197.9)	74.0 (73.7, 74.4)	2.6	164.2 (161.7, 166.9)	43.3 (43.0, 43.5)	3.8
Tairawhiti	209.8 (205.5, 214.0)	64.3 (63.7, 64.9)	3.3	182.6 (177.9, 187.3)	45.6 (45.1, 46.1)	4.0
Taranaki	197.2 (194.6, 199.8)	14.5 (14.4, 14.6)	13.6	94.5 (92.2, 96.8)	9.4 (9.3, 9.5)	10.1
Hawkes Bay	180.9 (178.8, 183.0)	63.6 (63.3, 63.9)	2.8	468.0 (460.3, 475.6)	69.6 (68.8, 70.4)	6.7
Whanganui	241.4 (237.7, 245.2)	26.0 (25.3, 26.2)	9.3	192.6 (189.0, 186.2)	68.5 (67.9, 69.1)	2.8
Mid Central	144.9 (143.0, 146.7)	58.5 (58.3, 58.8)	2.5	218.3 (213.7, 222.9)	19.1 (18.9, 19.3)	11.4
Capital and Coast	189.1 (186.7, 191.4)	276.1 (274.6, 277.6)	0.7	120.7 (117.7, 123.7)	89.0 (88.3, 89.7)	1.4
Hutt	114.9 (113.5, 116.2)	64.7 (64.5, 65.0)	1.8	199.6 (195.2, 204.0)	82.9 (82.1, 83.7)	2.4
Wairarapa	171.0 (167.0, 174.9)	82.4 (81.5, 83.2)	2.1	296.4 (284.1, 308.8)	121.3 (118.4, 124.1)	2.4
Nelson Marlborough	196.1 (193.7, 198.4)	54.1 (53.8, 54.4)	3.6	296.9 (289.4, 304.4)	73.1 (72.0, 74.1)	4.1
West Coast	275.1 (269.5, 280.8)	39.6 (39.2, 40.1)	6.9	229.9 (222.2, 237.6)	35.5 (34.9, 36.2)	6.5
Canterbury	133.2 (132.2, 134.3)	124.7 (124.4, 125.1)	1.1	121.1 (118.8, 123.3)	91.7 (91.1, 92.3)	1.3
South Canterbury	207.0 (203.3, 210.6)	73.4 (72.8, 74.0)	2.8	76.8 (82.3, 71. 3)	97.0 (94.9, 99.1)	0.8
Otago	161.8 (160.0, 163.6)	96.3 (95.9, 96.8)	1.7	194.3 (189.5, 199.1)	88.9 (88.0, 89.8)	2.2
Southland	148.3 (146.0, 150.6)	125.0 (124.2, 125.7)	1.2	146.4 (141.9, 150.9)	74.8 (73.9, 75.7)	2.0
New Zealand	157.6 (157.2, 158.0)	79.7 (79.4, 80.0)	2.0	144.8 (144.2, 145.5)	53.0 (52.6, 53.4)	2.7

Table 27: Age Standardized Rates of Elective Hospital Admissions 2004-2007

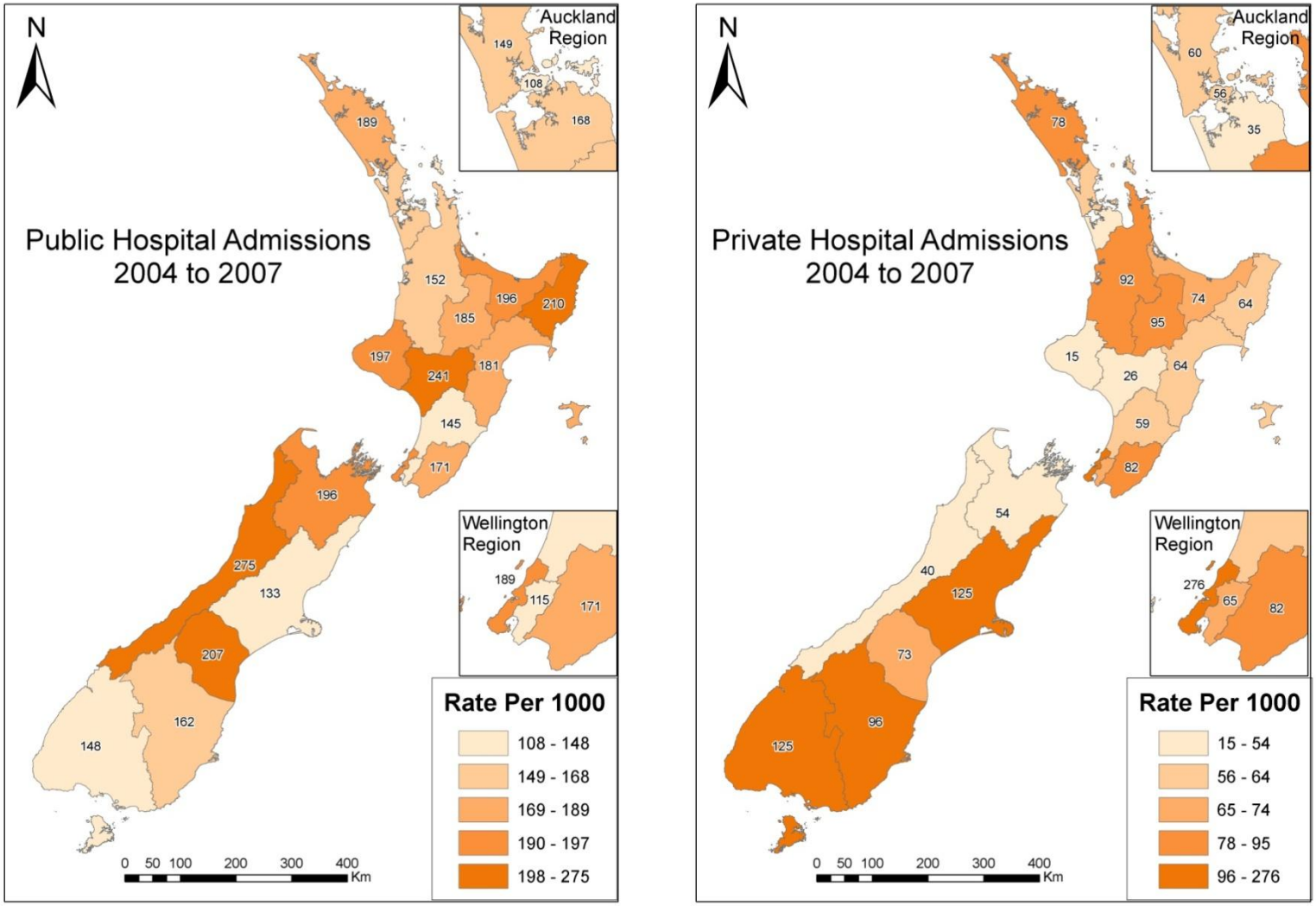


Figure 49: Public and Private Hospital Admissions between 2004-2007 (Rate per 1000)

Inter DHB Relationships

Maps were drawn to illustrate geographical relationships in public and private admissions results. Figure 49 displays admission rates per 1000 people over the four year study period. This shows one important finding which is: public and private surgery between 2004 and 2007 can be generally considered to substitute for each other. For the most part, there is a tendency for public (elective) admissions to be highest in those DHBs where private admissions are lowest and vice versa (Figure 50).

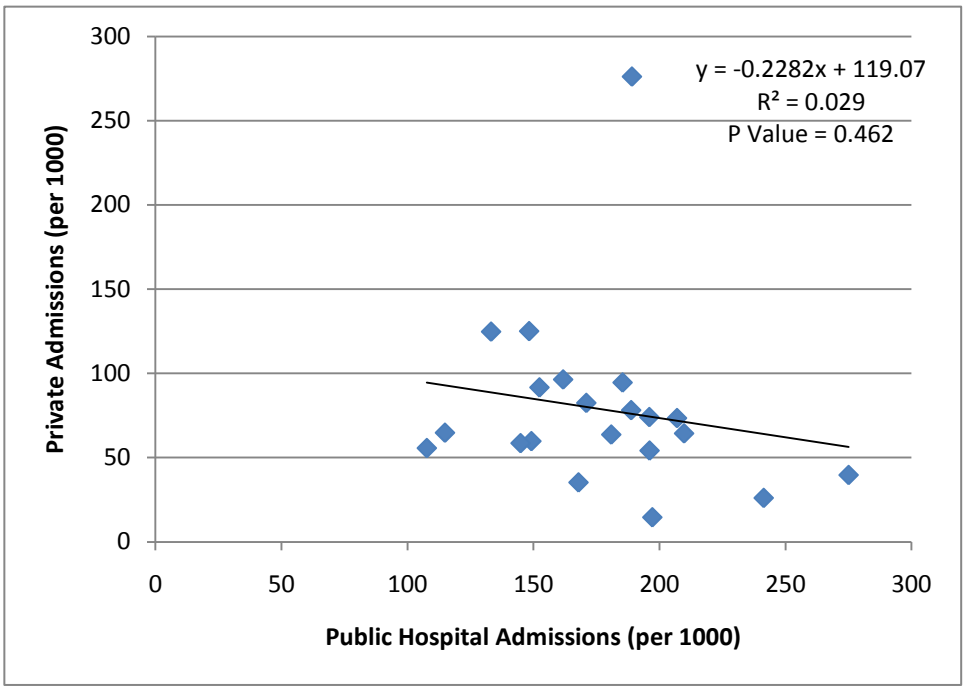


Figure 50: Public vs. Private Hospital Elective Admissions 2004-07

However, the regression coefficient, while negative, was not statistically significant. To a large extent this reflects the influence of Capital and Coast which is has by far the highest rate of private admissions of the 21 DHBs, and shows clearly as an outlier in Figure 50. When Capital and Coast DHB is removed from the analysis the P Value drops to 0.057 just outside the significant range and the R^2 Value increases to 0.188.

NZ Dep 2006 Groups 8, 9 and 10

The corresponding analysis on the most deprived populations shows a marked difference in admission rates in both the public and private sectors (Table 27). One would expect

deprived communities to demand higher levels of public treatments and fewer privately funded operations. For some DHBs this is the case but in some areas deprived communities seem to have greater access to private services. This trend shows up in the admissions ratios (highlighted in red) for Counties Manukau, Taranaki, Whanganui, West Coast and South Canterbury DHBs where a lower admissions ratio is observed among NZ Dep 06 groups 8 - 10.

There are two possible explanations for these unexpected results. Firstly, some DHBs purchase 'no waiting' services from the private sector, through this mechanism patients from lower socio-economic backgrounds have been able to access the private sector via public outsourcing of services. Secondly, the result may reflect the way the NMDS dataset is coded as discussed earlier in the limitations section in the methodology chapter. Because the NMDS data records deprivation at CAU the level and the NZ Dep 2006 index is designed for meshblock analysis some CAUs do not adequately represent the lower level meshblock scores. This problem arises as individual CAUs may contain up to 15 meshblock scores. The process of aggregation is shown in Figure 19. Therefore, the NZ Dep 2006 groups, 8, 9 or 10 CAU designations may include higher socio-economic meshblocks, containing people who are more likely to purchase private medical insurance or to pay for individual operations.

8.3.2 Hospital Admissions and Waiting Times

Figure 51 shows the relationship between public hospital admissions (specifically elective surgery) and median waiting time for each of New Zealand's 21 DHBs. While median waiting times decline as the level of public admissions increases, the relationship is not significant. However, it was previously suggested that treatment in the private sector can be considered a substitute for public surgery through the booking system. If this is to be the case, DHBs with low public admissions tend to have relatively high private admissions. So in DHBs with lower public admissions the public system may be competing for labour resources (such as doctors, nurses and other theatre staff) with strong private sector stakeholders and therefore may suffer higher waiting times as the public system loses valuable surgeon hours to the private sector. A further explanation is that DHBs with higher public admissions have a higher patient throughput and therefore, can maintain a greater efficiency which allows these DHBs to deliver a shorter median waiting time.

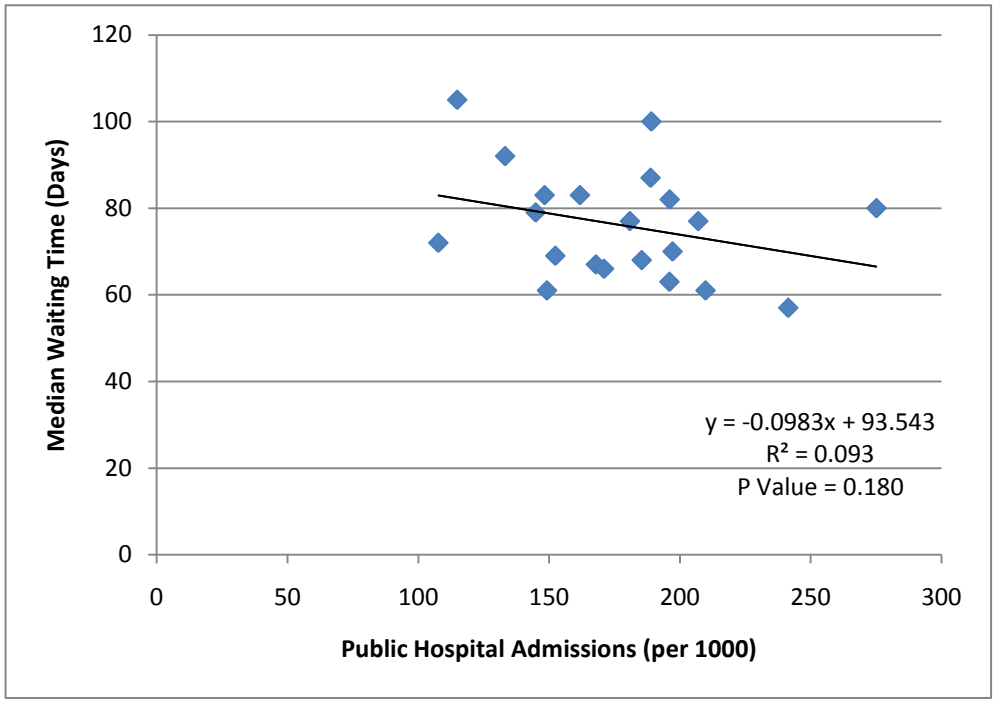


Figure 51: Public Hospital Admissions to Waiting Time 2004-07

Figure 52 compares the relationship between private hospital admissions and median waiting time for each of New Zealand's 21 DHBs between 2004 and 2007. The trend line gives a positive relationship between the two variables with a R^2 value of 0.29 and a P Value of 0.03 which is statistically significant. This is a very significant result as it confirms that DHBs with higher levels of private practice exhibit higher waiting times than those without private admissions.

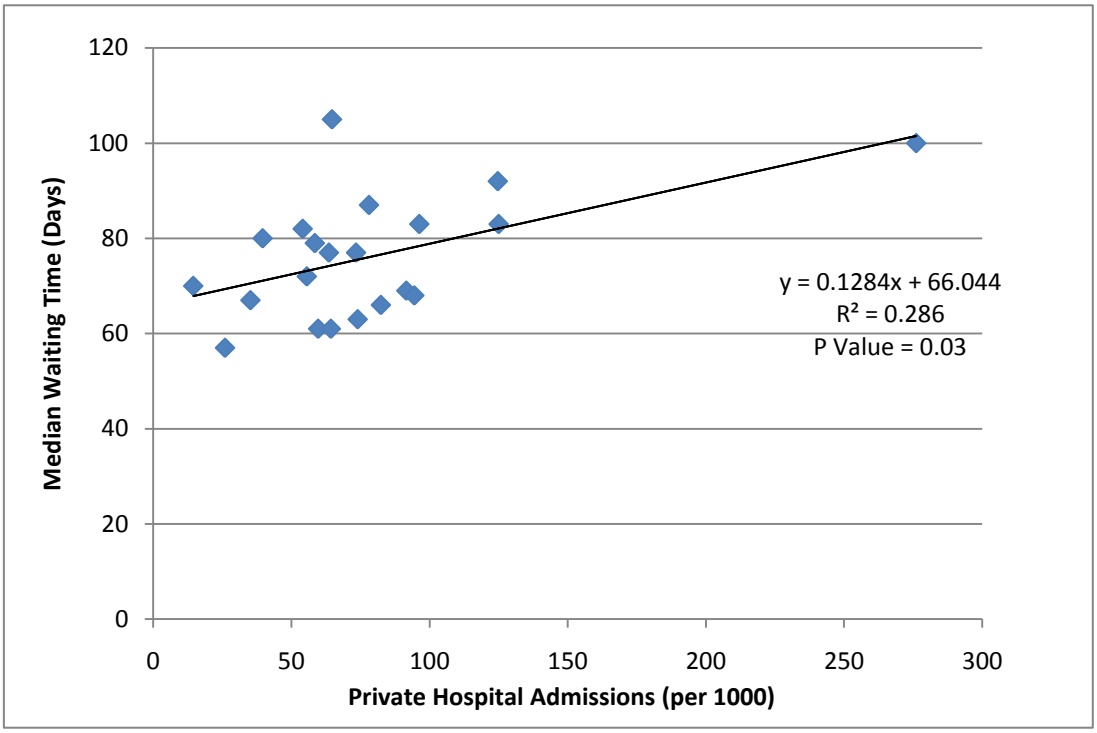


Figure 52: Private Hospital Admissions to Waiting Time 2004-07

There are two outlying points on this graph representing Hutt Valley and Capital and Coast DHBs that may affect the significance of the correlation and the predictability of the regression. The author choose to exclude Hutt Valley DHB at a median waiting time of 105 days and a private admission rate of 65/1000, in which case the P Value decreases to 0.01 and the R^2 value increases to 0.44 which improves the significance and predictability of the regression line. This further reinforces that in areas of high private provision waiting times tend to be higher than those with less private practice. The author also tried removing the Capital and Coast DHB from the analysis which is displayed as the point at which private hospital admissions are 276/1000 and waiting time is 100 days but this action decreased the significance of the P value to 0.041 and decreased the R^2 value to 0.224.

Figure 53 shows the relationship between the national admissions ratio between 2004 and 2007 which is reported in Table 27 with median waiting times reported in Table 10. The public/private ratio reports, for every one public admission in a DHB the amount of private admissions during the same period. The graph shows a negative trend line with an R^2 value of 0.13 and a P value of 0.096 which means it is not quite statistically significant. Essentially it tells us a similar story that in DHBs with relatively more private practice had higher waiting lists over the period 2004 to 2007.

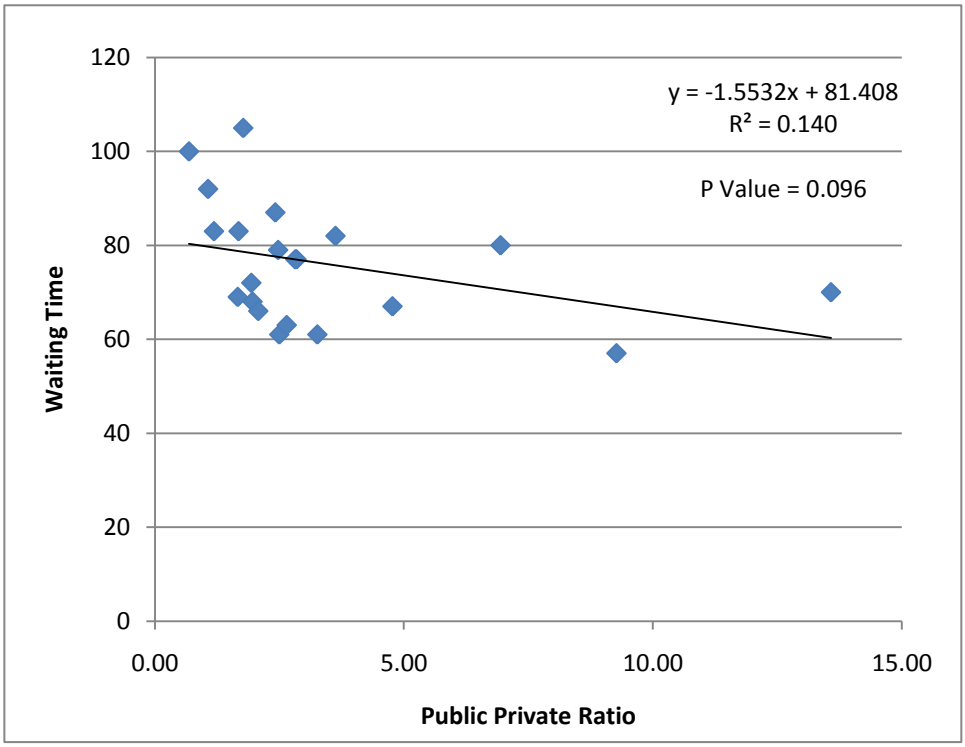


Figure 53: Admissions Ratio to Waiting Time 2004-07

Figure 54 displays the same information in the form of two maps which allows the reader to visually see how low private admissions reflect higher waiting times. The highest waiting times which are reported in Capital and Coast and Canterbury DHBs correspond to the areas of highest private practice. On the other hand, Whanganui with the least private admissions has the lowest waiting times. It is believed that if admissions were broken down by specialty that the admissions ratios would form much stronger relationships with individual specialty waiting times. Unfortunately, as conveyed in Chapter 5, the NMDS data was not available to be broken down by specialty.

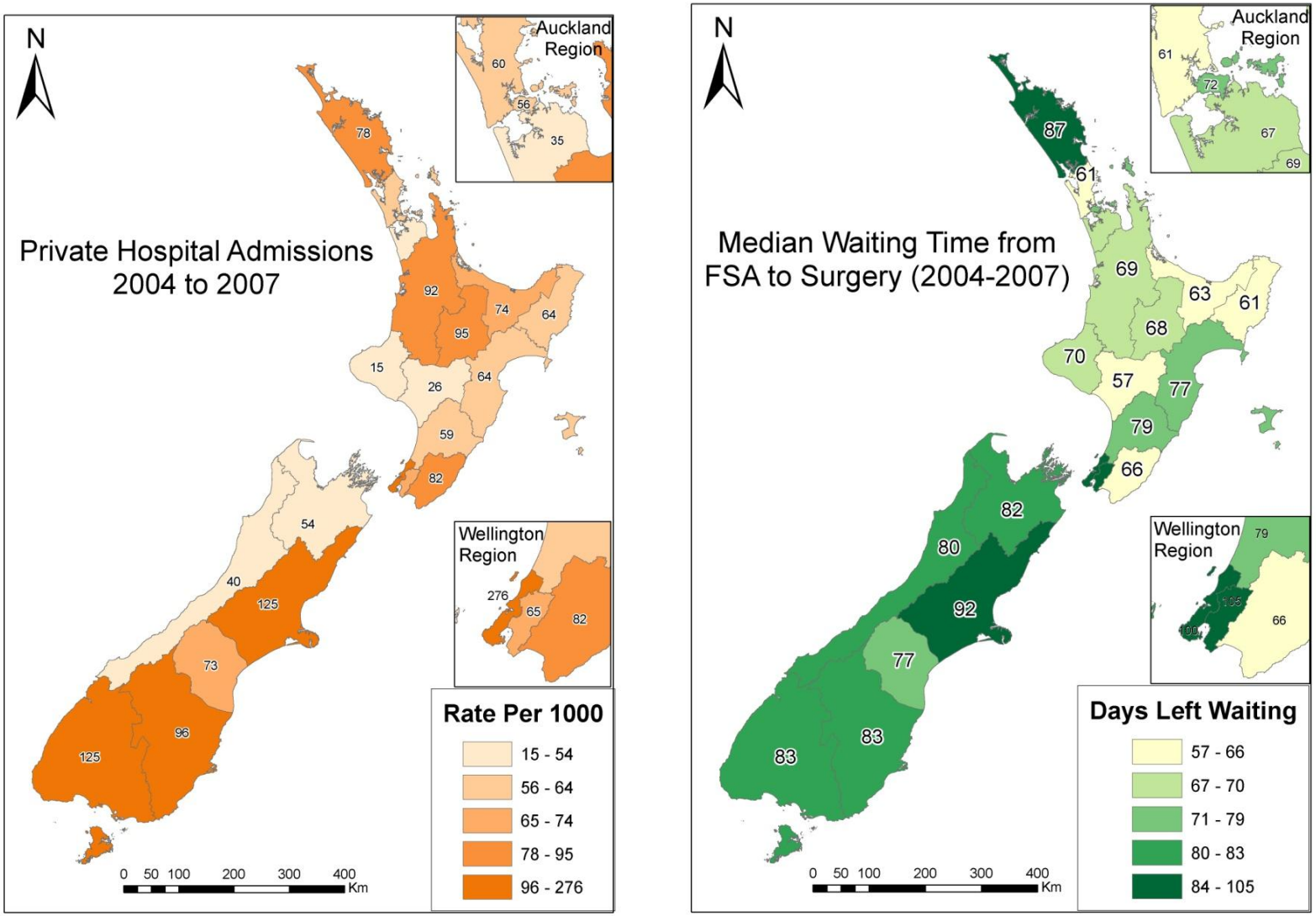


Figure 54: Private Admissions 2004-2007 beside Median Waiting Times

8.3.3 Private Hospital Admissions and Ethnicity

The number of private hospital admissions was divided by the population of two groups for each DHB. The first being Maori and Pacific Island populations and the second being the remainder of the population, most of which is made up of Europeans. These two groups were then correlated with the equivalent public hospital waiting times as observed in the NZBS. The data relating to Figure 55 and Figure 56 are detailed in Appendix 8 –Table 49. Each point in the graph represents one of the 21 DHBs.

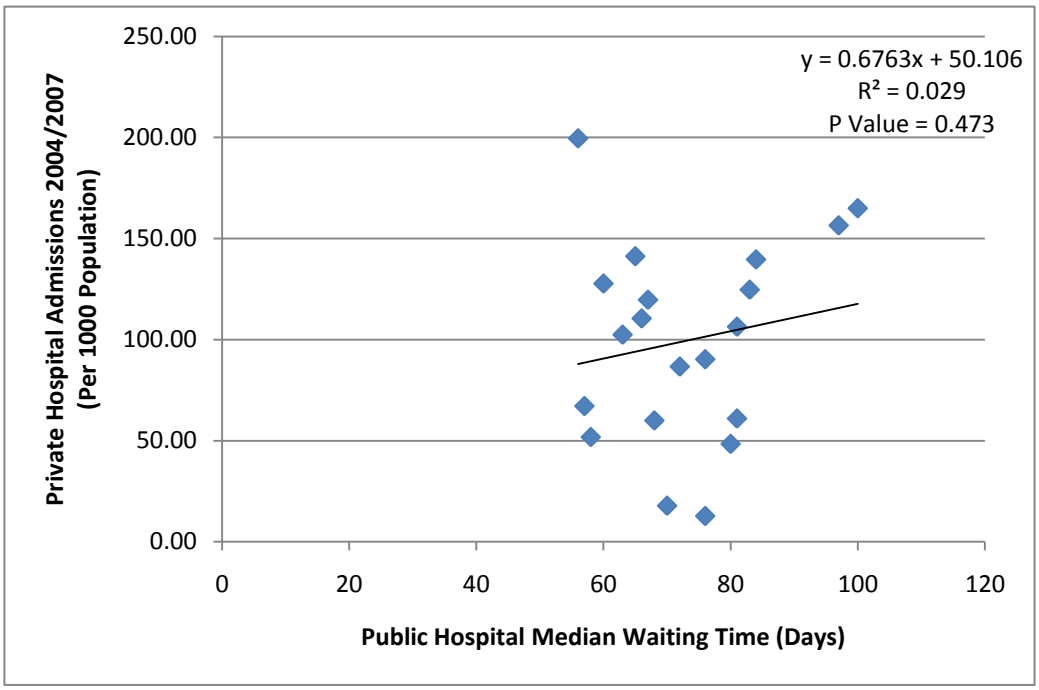


Figure 55: Waiting Times for European Patients by Private Hospital Admissions 2004-2007

Figure 55 does not show a statistically significant relationship between European private hospital admissions and waiting time but Figure 56, which compared these two variables for Maori and Pacific Island patients, does show a significant positive relationship and a R^2 value of 0.23.

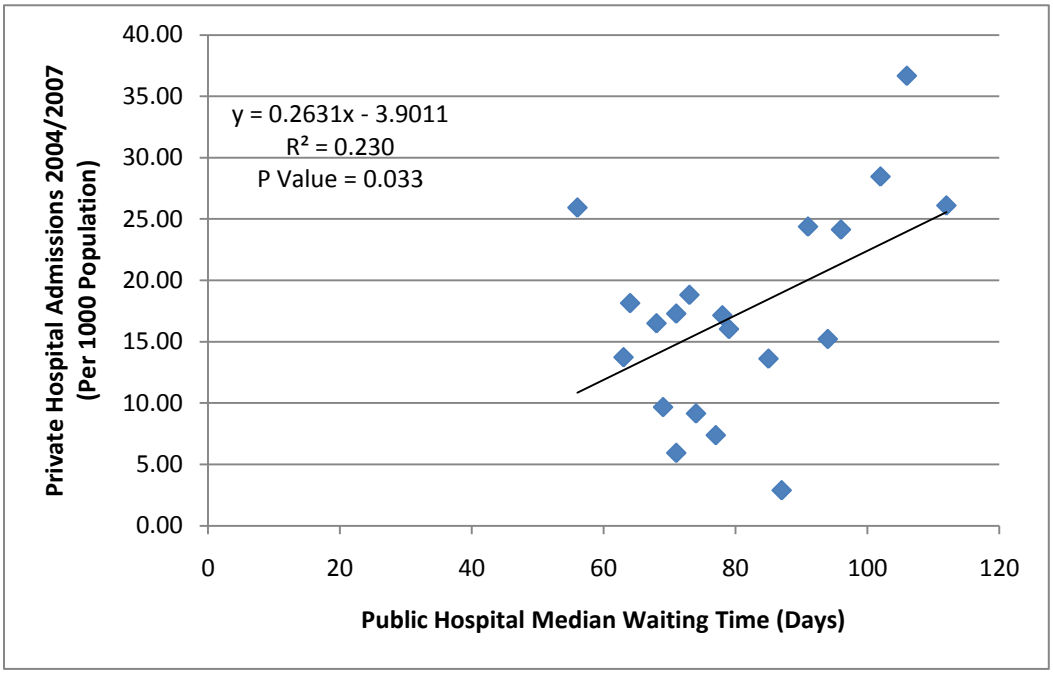


Figure 56: Waiting Times for Maori and Pacific patients by Private Hospital Admissions 2004-2007

8.3.4 Private Hospital Admissions and Deprivation

As undertaken for ethnicity under section 8.3.3 the number of private hospital admissions was divided by the population of two groups for each DHB. The two groups are divided into patients that have a NZ Dep 2006 score of between one and five which are determined to be the affluent populations and those patients that have scores between six and ten, taken from deprived populations. These two groups were then correlated with the equivalent public hospital waiting times as found in the NZBS. The data relating to Figure 57 and Figure 58 are captured in Appendix 8 – Table 50. Both Figure 57 and Figure 58 show statistically significant positive relationships between private hospital admissions and public hospital waiting times with an R^2 value of between 0.22 and 0.24. This does not represent a result any more significant than that seen between private admissions and median waiting time in Figure 52.

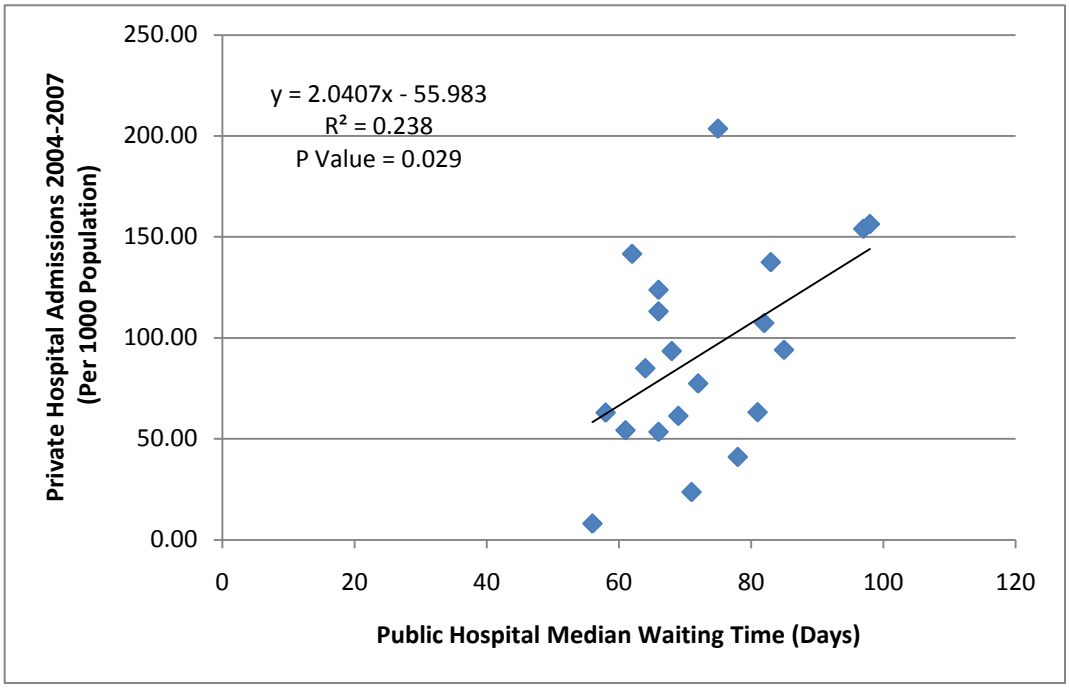


Figure 57: Waiting Times for NZ Dep 2006 Deciles 1-5 by Private Hospital Admissions 2004-2007

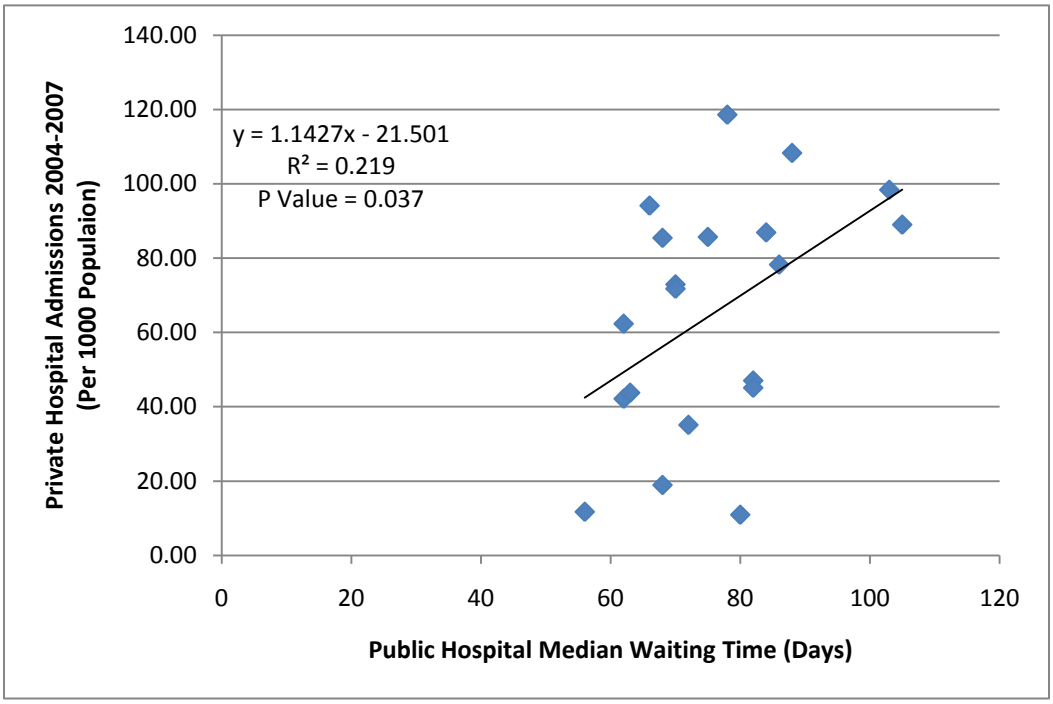


Figure 58: Waiting Times for NZ Dep 2006 Deciles 6-10 by Private Hospital Admissions 2004-2007

8.4 Conclusion

This chapter focused on the contextual influences on waiting times experienced in the public hospital sector with the aim of explaining some of the geographical variation in public waiting times found throughout Chapters 6 and 7. There were three significant findings that were made during this chapter. The first was that analysis of the urban/rural effect on public hospital waiting times within the NZBS did not show a significant or consistent relationship. Although when separating Europeans from Maori and Pacific patients, the second group had an increased waiting time between secondary urban and other rural areas when you disregard the main urban areas. Overall, the results showed no significant findings that would suggest longer waiting times were experienced by those who reside in urban areas. Secondly, admission results showed that private surgery can be considered to act as a substitute for treatment in the public system but that deprived communities in most DHBs have less access to 'no waiting' private hospital services. Thirdly, when relating admission rates back to public hospital waiting times, statistically significant results showed that DHBs with high private admission rates also experience high public hospital waiting lists. This analysis was also broken down by ethnicity and deprivation. Although, most of the results proved to be statistically significant, the relationship did not strengthen in any case while comparing European to Maori/Pacific patients or when comparing high and low deciles of deprivation. The author will now discuss some of the findings from Chapters 6, 7, and 8 in relation to those from of other studies and try to draw some relevant conclusions in Chapter 9.

9 Discussion and Conclusions

9.1 Introduction

This chapter will discuss the key findings from objectives one, two and three in the light of feedback received from interviews that were conducted with a mixture of medical specialists, hospital managers and administrators in February 2011. For objective 1 the geographic differences in waiting time that were found are discussed along with some explanation of these results. Discussion relevant to objective 2 is examined in relation to variations found in waiting times according to individual social and demographic characteristics. Contextual factors that were found in accordance with objective 3 are then considered, particularly public private relationships in relation to effects on access to elective services. Next, some of the theoretical implications of research conducted for this thesis will be explored. Policy implications are then considered, in particular, reporting, prioritisation practices and the smart use of the private hospital sector to increase public access to elective services. Recommendations for future research will follow before a final concluding statement on the findings of this thesis.

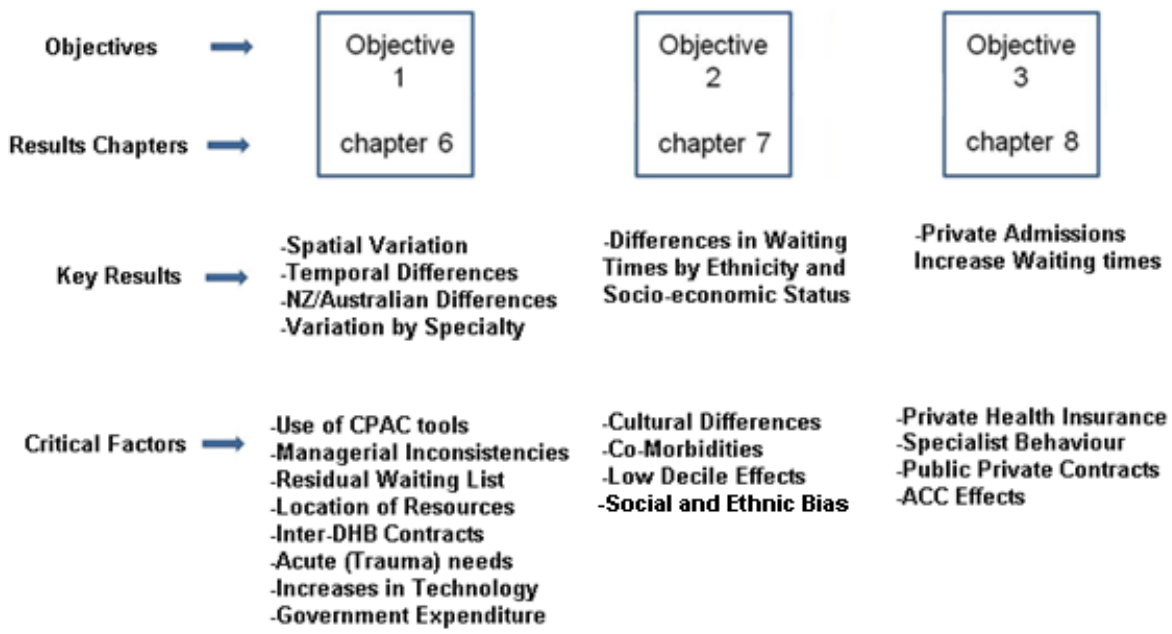


Figure 59 Conceptual Diagram for Discussion

9.2 Discussion

This thesis has produced evidence to suggest that the NZBS is not operating under equitable, consistent and transparent prioritisation processes as was originally proposed. Little research has recorded patient access to elective surgery using waiting times as a measure since the CPAC prioritisation tools were introduced. Most have examined prioritisation processes (Derrett, 2005, Gauld and Derrett, 2000), and referral practices of physicians prioritising patients for surgery (McLeod et al., 2004a, McLeod et al., 2004b). These studies have found that the introduction of the booking system has favoured some patients while leaving others worse off. Derrett et al (2009) is the only author to have reported spatial variation in waiting times since the booking system was introduced in 1998. Derrett et al's (2009) study also found a relationship between waiting times in the booking system and private hospital admissions showing that in certain procedures patients were waiting longer in DHBs that also have high private hospital admissions.

The three objectives of this thesis challenged the existing literature to see if past findings held true when the entire NZBS was considered over the period 2004-2007. The first objective sought to examine the spatial variation in waiting times, the second to establish any individual variations and determinants of waiting times and the third set out to investigate contextual factors in determining waiting times, specifically public private interactions. This chapter discusses the key results that have emerged from the research associated with these three main objectives and relate them to a number of key factors that identified in the literature and during interviews conducted with specialist physicians and hospital administrators. A summary of key results and critical factors that make up the discussion are illustrated in Figure 59.

9.2.1 Geographical Differences in Public Waiting Times

Objective 1 - Key Findings

Results for objective one, which are found in Chapter 6 of this thesis, emphasised geographical differences in the time patients wait for elective treatments depending on which the DHB in which they reside. Results show a north-south gradient which shows southern DHBs reporting higher waiting times in general than their northern counterparts. Within New Zealand, Waitemata, Bay of Plenty, Tairawhiti, Whanganui and Wairarapa DHBs consistently have lower waiting times while Northland, Capital and Coast, Hutt Valley and

Canterbury DHBs which have much higher waiting times. As well as geographical differences, New Zealand DHBs showed a large degree of temporal fluctuation in waiting times over the four year study period. Large differences were also shown when waiting times were compared between New Zealand and Australian regions. Australian patients tend to wait almost half the time for elective procedures in public hospitals when compared with waiting times experienced in most New Zealand DHBs.

Waiting times were also broken down by the five common surgical specialties of general surgery, orthopaedic, ENT, gynaecological and ophthalmologic forms of surgery. When reported by DHB for 2004-2007 different patterns emerged showing that some regions are strong in the delivery of some services but struggle when providing others. For example Whanganui performs amongst the best out of the DHBs in providing timely general, orthopaedic and ENT surgery but fails to provide timely ophthalmological and gynaecological services. These differences are widespread across New Zealand, in some cases there are more than 100 days of difference observed in median waiting times both within and across specialties.

The results expressed above can be explained by eight particular processes listed below which are then discussed in detail:

- the 1998 adoption of **CPAC scoring systems** which were supposed to provide a nationally consistent means of prioritising patients for publicly funded elective surgery under the NZBS.
- **Managerial inconsistencies** in setting scores in relation to financial thresholds for surgery have had an impact on waiting times across specialties and spatially by DHB.
- **Residual waiting lists** are an important factor. While it is not measurable and does not have an impact on waiting times, it does have an impact on patients' overall access to treatment through the public hospital system when patients do not meet the financial thresholds required to receive treatment.
- The **location of resources** and **inter-DHB contracts** similarly have an effect on waiting times as patients living a substantial distance from a hospital often suffer poor access to essential services.

- **Acute health events and trauma** have a significant impact on elective services. When public hospital resources are tied up performing procedures on trauma patients and acutely ill there is less time available for elective surgery.
- Increasing use of **technology** has also been a factor in the demand for elective surgery increasing waiting times in some areas.
- The level of **government expenditure** may also contribute to waiting times as evidenced by the differences between New Zealand and Australian waiting times.

CPAC Scores

Evidence suggests that CPAC scoring systems vary across DHBs with some not opting to use them at all, as Specialist C mentions in his comment:

"There is inconsistency in the adoption of CPAC scoring systems nationally, and you look at the waiting times, it shouldn't be like that. The whole point, there has been this real effort to make waiting times consistent throughout the country and it is very difficult to do that." (Specialist C.)

After conducting interviews with some key specialists and hospital administrators it became clear that some specialists were not even using CPAC tools, others left the job of allocating scores to hospital managers to administer scores. For example, specialist A had not heard of Clinical Priority Assessment Criteria (CPAC) tools before. He comments:

"I am at the sharp end, I just turn up to operate on the patients that are there and I really can't be bothered with the bureaucracy that goes on behind closed doors. I either circle routine or urgent or if I believe there is no clinical need for surgery I send the patient back to their general practitioner. I discourage people from having surgery if I think what they have is going to be a self-limiting thing. For example, people turn up with ganglia, a cyst on the back of the wrist, a condition that given time usually goes away by itself and I tell them to go away and let it go away by itself. Whereas some people insist, 'no, I want this taken off' and when I put them into the system I don't circle urgent. These people fall into the hole, they receive a letter saying they are not able to have their surgery within six months." (Specialist A.)

When asked if he went through the process of individually scoring patients for surgery Specialist A replied *"…no, I don't know who does but it is not me." (Specialist A.)* As it turns

out the author was introduced to the wait list coordinator, a nurse manager who acts as a go-between for the patient, surgeon and DHB management. She comments:

"I book people's surgery and do so according to people's urgency so I don't really have a lot to do with reporting, that's my manager's responsibility. We use urgent (70 points), semi-urgent (60 points) or routine (59 points). I book people from the waiting list, who are urgent and then I review the patients. They are sent assessment forms and review them to urgent if required, in consultation with the specialist. These patients are on active review and part of the process is every six months they are sent a self-assessment form which they fill in and we look at that and consider whether they need to have an outpatient appointment, need to be increased to urgent or needs to be discussed with their GP. After 18 months [..of…] patients […being…] under active review a decision has to be made whether they are given certainty for an operation and increased to urgent or sent back to their GP. The specialist will either place the patient on the waiting list as either certainty or under AR." (Administrator C.)

Other specialists interviewed did administer CPAC scores noting they had to use them as a standard scoring system for anyone entering the public hospital system. Although Specialist C commented that the nurse is supposed to do the scoring as this is meant to put more objectivity into the system but in reality he did most of the scoring. In ophthalmology CPACs are only available for cataract surgery so a lot of other treatments such as corneal transplants are scored but there is a lot of leeway in there. It depends how bad the vision is. In fact, most of the people who have surgery for corneal grafts the vision is so bad that their score is off the scale for both eyes anyway. Specialist C comments:

"For things like squint surgery which is a significant part of ophthalmology where people with wandering eyes have their eyes straightened. It's almost impossible to kind of score that[sic]. It's basically urgent every time and you just make up a number which defeats the purpose a bit. But cataract surgery is probably the bulk of what we do and it is what the government obsesses about and it's reasonable to score that because its relatively objective. You give the patient a score for: visual acuity, hand movement, vision in both eyes (35 points), reading acuity, difficulty driving, carrying out daily activities, ability to work and other disabilities. So it is not completely objective, some fudging can go on there. For non-cataract stuff, someone who comes across with trauma enters the system as acute. So the score is irrelevant, or for infections the scores are very high as well. You just give a number between 21 and 50, 21 is under the threshold and 50 is way over. In Wellington you can put the score

in and put what's called a 'clinical override'. For example, someone who is extremely short sighted and you have one eye done, and the eye operated on is no longer short sighted. They are hopelessly unbalanced, have real trouble driving and stuff like that but because they can see out of one eye their score goes right down. They may be under the threshold, but because they can't cope you put […in…] a clinical override, so you can override the scoring system. The whole thing about CPAC is to make it objective and fair in recognition that you have to ration services, it's as simple as that. I find the subject irritating because of the manipulation that goes on."

Specialist B reflects that for operating lists for urology there is consistency applied in CPAC scores across the Capital and Coast and Hutt Valley DHBs since all the Hutt Valley work is conducted in Wellington. He goes on to describe the CPAC form used by all five urologists in the Capital and Coast DHB:

"We have a scoring system based on whether there is any evidence of malignancy, degree of social disruption for the patient, and the degree of symptomatology in terms of whether it is having an impact on their quality of life. There is also a little column in terms of social benefits. The form is such that it is basically impossible to get it wrong."

In some cases, as Specialist C has explained, the specialist has the ability to override the prioritisation scoring systems. Specialist A goes on to point out how he has the ability manipulate the waiting list to suit if a patient really would benefit from prompt treatment. He cites a recent example:

"I had a clinic on Tuesday and there was a man with a 'trigger finger', trigger finger is not a life threatening condition. This guy wasn't using the finger because it was so painful when it locked and his partner had to straighten it out for him, but it would make her sick every time she did it. So I went up to the waiting list office and said what have I got on Monday? The nurse manager said these procedures and you have a cancellation. I said right, let's book this guy in on Monday."

With such a variable use of scoring systems and the specialists' ability to manipulate scores it is not surprising that waiting times vary so much across New Zealand. From the feedback seen above it seems clear that along with differences in CPAC scoring tools, specialist adoption and use of the prioritisation criteria also varies to a large extent. This inconsistency

in referral practices means that patients of equal need are not being served equally between DHBs and in many cases locally from specialist to specialist.

The author will now examine a related factor which has an influence on the speed of which patients can expect access to elective treatments, which are DHB management practices and the continual revision of CPAC scoring thresholds.

Managerial Inconsistencies

In Chapter 3 population-based funding was seen as a key strategy introduced in New Zealand to create equitable access to health and disability services across the country from 1983. This has not resulted in a guarantee of consistency between DHBs in providing elective treatments as DHBs retain the ability to shift funding between services which they deem important. Also, the advent of the NZBS has meant the introduction of performance indicators that the DHB management has significant control over, namely ESPIs described in previous chapters. Qualitative feedback suggests that hospital managers and administrators are now crucial to controlling waiting times as they are the ones who set and adjust the financial threshold for which patients need to score enough CPAC points to be considered for surgery. It is hardly equitable to drop people from waiting lists as a result of the DHB managers deciding to change a financial threshold especially if there is not consistent use of CPAC prioritisation tools, as seen above.

Several of the interviewees expressed concerns about how the DHB regularly manipulated thresholds in order to meet Ministry of Health ESPI targets. Comments such as:

"It seems to me like they are massaging the numbers, in that if someone doesn't appear to have something that needs to be treated urgently then they are put in a holding pen, they don't go on a waiting list which is really just massaging numbers and making things look better than they actually are." (Specialist A.)

"The DHB shifts the threshold around to keep waiting lists low, it's what we spend half our time arguing about at business meetings is the fiddling of , altering the threshold because the problem is they get threatened with sanctions, get money (funding) taken away if they are under the threshold. So basically patients get told, oh well we can't do your surgery. I could go on forever about this." (Specialist C.)

Administrator B mentioned how important hospital managers were to DHBs in order to keep meeting the ESPI targets. In his experience as a DHB board member he reported cases of theatre lists falling behind as the result of managers leaving. This is not surprising as in ophthalmology services Specialist C said that the DHB increases or decreases the threshold three to four times a year and they are always mentioning it in meetings. The example of the approach taken by senior DHB executives is summed up extremely well by Administrator B who recollects the approach taken by Mid Central DHB:

"*Well yes, we could put more people through for first specialist assessment to see whether they need surgery but we are meeting our targets so, instead, we are going to spend the money somewhere else."*

Administrator B goes onto state *"…there's probably a fair amount of unmet need in Palmerston North and that decision has been made by the CEO of the DHB. These decisions are taking place regularly. Yes there are probably a lot of people that are not getting the treatment that they need and some of the people would obviously fit into the lower deciles but they are not worried about it because if the Ministry is not asking […it…]of them then they are not going to do it. So that's also an issue."*

As mentioned in earlier chapters all DHBs are currently meeting their ESPI minimum standards required by their central funder, the Ministry of Health. Administrator A responded by saying *"…five years ago, it was a different story and I don't know whether they have improved productivity because of the fact that there has been a focus on trying to improve productivity."* Also, it is evident that DHB management has learnt how to plan ahead and manipulate waiting lists in order to ensure they meet ESPI targets by making decisions like those explained above. This may have been forced by way of government pressure in meeting ESPI targets which, as Specialist B mentions, filters down so DHBs are continually putting pressure on medical staff to get their waiting times down.

Residual Waiting List

Among other things, Chapter 5 identified the inability to measure the presence of a residual waiting list. This is a group of patients who the surgeon believes should be treated but are left without treatment because they do not meet the financial threshold set by the DHB as discussed above. This has been explained further in Chapter 4. When asked how often they

come across patients that should be treated but are not treated because they fall below the threshold, mixed feedback was received as shown as seen in the following comments:

"Very seldom. Patients that I put on the waiting list usually have a need to get something done. (Specialist A.)

"Of course, frequently, particularly [for] cataract surgery. Say someone with 6:18 vision, that does not meet the vision for driving, if you do one eye the score is going to go below the threshold because their vision is not good enough but they're driving with one eye and they're prone to falls, certainly less safe driving. Poor 3D vision, all that stuff so they'd definitely benefit but their score falls below the threshold [sic]. (Specialist C)

The residual waiting list is a very tangible group made up by two groups of patients. Firstly, patients that specialists consciously score below the financial threshold never make it onto the waiting list. Secondly, there are those patients that fall off the waiting list as a result of changes in the financial threshold. There is currently no measure of this group reported to the Ministry of Health and it is unreported by individual DHBs. An evaluation of patients which fall into this unfortunate group would be a unique measure of unmet need in the market for elective hospital treatments.

Location of Resources

The location of resources, such as hospital theatres and human resources e.g., specialists and anaesthetists, are not spread evenly around New Zealand. Medical specialists particularly choose to be clustered around hospital facilities that are contained within the main centres. Waiting times may be affected to a large degree by travel distances that patients have to travel to access specialist health care, Administrator B notes:

"When you get into the geography of it all, I think that it really reflects the issue that Wairarapa people are right next door to the big city so if they need cardiac surgery it is going to be done in Capital and Coast DHB anyway, but on the other hand the West Coast is far away from anywhere, and to my knowledge there is only one surgeon on the West Coast (General) but there must be more […patients…] coming over from Christchurch. So I think the geographical aspects of it are a very strong indicator of what you are able to produce. If you live in Haast the only way you are going to get near high tech anything is with a day's travel."

Although patients are required to travel great distances to access specialist services, population demands on a DHB, like the West Coast or Wairarapa, are smaller than felt in the DHBs containing main centres like Capital and Coast, Auckland or Canterbury. Smaller DHBs may be able to afford to outsource surgery to the private sector as well as rely on other public resources of outside DHBs. For example, Administrator B expressed that currently in Wairarapa DHB a patient need not wait longer than 3 weeks for a hip replacement at present, whereas in Capital and Coast DHB a patient would struggle to be treated within 6 months.

There are also experiences where resources are located in unusual places. Administrator B had spent time working in Ashburton and as he explains:

"The guys that do surgery in Ashburton do a lot of elective surgery and when they are not so busy the Canterbury DHB has them drive up to Canterbury or Kaikoura once or twice a week, where surgeries would be undertaken in Kaikoura (if minor) or if required they would take them […the patients…] down to Ashburton to make use of the theatres. This may explain why people are falling onto these long lists."

Inter DHB Contractual Relationships

Geographical differences in waiting times may be partly explained by the contractual relationships that exist between DHBs. As mentioned in earlier chapters some hospitals specialise in certain types of surgery, for example Capital and Coast DHB do not have a plastic surgery unit and rely on the Hutt DHB which has the National Plastics Centre. But this is a reciprocal arrangement as some services are not catered for in Hutt DHB so patients in specialties such as urology travel to Capital and Coast DHB for treatment Administrator B states *"Currently about 42% or 43% of surgery for Hutt DHB is done by Capital and Coast DHB."* Other DHBs which mostly comprise rural residents rely on the services of outside DHBs for specialist services. Administrator B demonstrates this in saying:

"Everything that Wairarapa DHB is getting is being done in Capital and Coast DHB and the same issue comes with many patients from around the South Island receiving operations in Christchurch hospitals. We have these bizarre situations where patients have needed MRIs done and they could get it done at Hutt DHB tomorrow but they can't get it done at Capital and Coast for months. There are profound differences in the availability of other resources of which are needed before surgery that would add time to patient wait."

Acute (Trauma) Event Effects on Elective Services

The availability of theatre time for elective surgery procedures depends on the amount of trauma each DHB has to deal with in its hospitals. Administrator A explains:

"The other factor to consider with orthopaedics is the impact of trauma, because that was always a problem. You know, you only need a bloody good road accident and there is no theatre available for two days to do electives. That might have been more of the case then but I don't think that is the case now, because as we have advocated strongly for DHBs to try and have a more dedicated theatre resource for electives, no matter what and a trauma theatre that is sitting there ready to go."

As recently experienced with the Canterbury Earthquake Disaster of 2011, we can see how large trauma events can tie up operating theatres for weeks and, as reported through the media, the first thing to be postponed will be elective procedures which may have to be carried out in a different DHB or much later in the DHB the patient resides in. Although, Specialist A believes New Zealand hospitals have not been under any more pressure than has been experienced in the past from trauma events, he explains:

"I don't think this has changed over a 20 year period, I mean New Zealand's population has not gone up substantially and I don't think that we have any more trauma now than we ever had in the past. In fact, in years gone by the speed limit was greater and there was no compulsion to wear seatbelts our road trauma was vastly greater, in fact it's one of the reasons that the renal transplant rate is not that high in New Zealand now because we don't have that much carnage on the roads."

Increases in Technology

Another factor which has an impact on waiting times for elective treatments in public hospitals by way of reducing surgical throughput are advances in medical technology which has been discussed in Chapters 2 and 3. Specialist B gives an explanation of how this places strain on the sustainability of New Zealand's health system:

"Say, for example, 10 years ago, to take a kidney of a patient out it was a relatively straight forward 90 minute procedure, now if you're taking a kidney out you will do it laparascopically, you will do it with telescopes and those procedures can take six or seven hours so the

surgical throughput is hugely diminished as a result of that. Similarly with excellent cardiac care at the moment you find that you are keeping patients alive a lot longer so what happens is that instead of having a heart attack and dying they have a heart attack and are readmitted to hospital for further care. So our advances in technology are not keeping people out of hospital. What is happening is, the advances in technology are making people live longer with more complex conditions that require higher readmission rates and longer periods of time in hospital. These days if you get an 85 year old coming in with really bad chest pain they may be admitted to put a stent in to open up their coronary arteries. Fifteen years ago they probably would have had a coronary and died, you know. So that person becomes a much greater burden on the system and those are very important factors that I think you are going to need to build in to make it complete."

Government Expenditure on Hospital Resources

The author does not have much evidence of factors that could explain the differences of waiting times for elective surgery between New Zealand and Australia other than the amount of funding that is injected into each nation's health care sector per capita. As Administrator B expresses:

"The amount of money that the Australian Government put into their public health system compared to what we do, is astronomical."

On the basis of per capita expenditure on health and disability services, the OECD reported New Zealand spent $9,134 USD with Australia spending $12,371 USD over the same period between 2004-2007 (OECD, 2010). These figures show that the Australian Government spends a quarter more on health and disability services per capita than New Zealand, which goes some way toward explaining the vast differences in waiting times for elective treatments. As waiting times are simply used as a form of rationing health services, diverting more fiscal resources to the public hospital sector means Australia has the ability to deliver a higher throughput of operations. On the 28th of April 2011 the media released updates of the National Government 2008 promise to invest money in twenty new dedicated elective surgery operating theatres in the hope that this would improve the throughput of elective treatments (Johnston, 2011b). Funding injections like this may help close the gap between New Zealand and Australia that has been shown throughout the results. However, New Zealand Minister of Health, Tony Ryall acknowledged there is *"…no definite period for completing the theatres, although it may be over the next five years."*

9.2.2 Socio-Demographic Differences in Public Waiting Times

Objective 2 - Key Findings

Results for objective 2, which are found in Chapter 7 of this thesis, show inequalities in patient access to timely elective surgery in the NZBS depending largely on individual determinants such as age, sex, ethnicity and socio-economic measures of deprivation. The most interesting results that came out of this analysis were comparing waiting times experienced between patients of different ethnicity and between socio-economic groups. It is important to note that when comparing ethnicity against deprivation differences, ethnicity had a far more pronounced effect over the waiting times patients experienced over the study period.

Small ethnic differences of up to seven days median waiting time showed up immediately when analysis was conducted on the entire booking system during 2004-2007. These differences were noted particularly between Europeans and minority ethnicities such as Maori, Pacific Island and Asian patients. When results were broken down by DHB differences in waiting times significantly inflated, the most dramatic being that of 90 days between neighbouring Wairarapa and Hutt Valley DHBs. It was shown that Europeans experience shorter waiting times than any other ethnic group but differences vary geographically.

Differences in waiting times were shown of up to five days between patients of highest and lowest social deprivation when analysis was conducted across the whole booking system. Those from deprived backgrounds tend to wait longer than affluent patients. Differences waiting times when considering individual patients' deprivation increased when results were broken down by DHB. Although, when waiting times were measured by NZ Dep 2006 deciles in each DHB only the results from seven were considered significant results after using correlation analysis to test this relationship. These were Waitemata, Auckland, Counties Manukau, Hawkes Bay, Hutt Valley, Canterbury and Otago DHBs which experienced differences of up to 10 days median waiting times between patients depending on their individual deprivation score.

The results that were found in Chapter 7 and summarised above indicate that:

- Maori and Pacific Island patients as well as socially deprived patients have longer waiting times for elective surgery. Previous literature and the feedback from qualitative interviews of medical specialists and hospital administrators has provided some critical reasons factors for this. **Cultural differences** mean that certain ethnic populations, in particular Maori and Pacific Island patients are reluctant to seek medical care.
- Both, socio-economically deprived and Maori and Pacific Island individuals also tend to suffer a higher level of **co-morbidity** which can also lead to longer waiting times.
- **Lower decile** status also impact upon patient's ability to get elective surgery as they tend to have higher rates of co-morbidity as a result of high environmental risk factors and are financially unable to seek treatment independently.
- There are apparent **social and ethnic biases** in the allocation of health services.

Cultural Differences

One of the major findings from Chapter 7 was the variance in waiting times depending on a patient's ethnicity. There are two major factors that seem to be operating which both grow out of the fact that there are significantly different cultural processes at play when specifically Maori and Pacific Island patients seek care. Many studies report that there are cultural differences in patients' choosing whether or not access primary care and higher levels of specialist treatment as described in Chapters 2, 3 and 4. Specialist B comments:

"I think certainly in terms of the Maori/Pacific population, they certainly are much more reticent about seeking care and very rarely put personal pressure […on…]to be put up waiting lists, they are much more withdrawn in terms of that, so that is definitely a factor. So I think the average Pakeha is a lot more pushy in terms of what they want and there is no question that that is a factor and that is a cultural thing. It is not a reluctance of the doctors to put Maori and Pacific Islander's on the list it's just the way people's personalities are I guess. And also, you find that Maori and Pacific people present much later and therefore, their conditions are often much more severe."

This is reiterated by a comment made by Administrator B:

"One of the things that more than a few people have commented on is that Europeans as a group would be putting on a significant amount of pressure, whereas some of these other folk are far more, 'whenever I can have it done'[sic]. The expectations are very different and the anxiety to get something done right now is much more of a Pakeha trait than it is in these other groups."

These findings have been seen throughout other literature on ethnic exclusion in the use of health services. In line with specialist B's comments, Haynes et al (2008) found that ethnicity was strongly associated with late presentation of common cancers in New Zealand, particularly for Maori and Pacific Islanders. Even, after controlling for stage of presentation, such groups still have a poorer chance of survival from cancer, suggesting that other institutional factors were at work within the health system in determining access to care for these groups. Other research from a variety of national contexts also supports such institutional 'biases' in the delivery of care (Bach et al., 1999, Haggstrom et al., 2005, Morris et al., 2004, Mathur et al., 2010).

Research that has followed the provision of elective services as administered through the booking system has discovered differences in patient behaviour leading to preferential treatment and the way that Pakeha put pressure on specialists to move faster through the system, i.e. the 'squeaky wheel phenomenon' (Gauld and Derrett, 2000, Roake, 2003, Howden-Chapman and Ashton, 2000). This could be reflected by some of the above results that show European patients moving through the system faster and being subject to shorter waiting times in most DHBs. Others, as reported throughout Chapter 4, found that some specialists took into account the patient's ethnicity, giving preferential treatment to Maori and Pacific Island patients (McLoed et al., 2004), in which case you might see the opposite trend arising as seen in Whanganui or Wairarapa DHBs where Pacific Islanders experience significantly lower waiting times than European patients.

Co-morbidities

Part of the explanation of why Maori and Pacific Island patients remain longer on waiting lists may be the existence of co-morbidities. These are specifically found in overweight patients who carry additional risk of illnesses such as diabetes, kidney disease and respiratory illness. These conditions plus their obesity pose extra risk during surgery. These conditions

of co-morbidity are far more common in Maori and Pacific patients and the reason these delays surgery are summarised by Administrator A:

"The other thing you have got to remember with the ethnicity thing is that […you…] have co-morbidities that are probably significantly higher in Pacific Islanders. Orthopaedic surgeons don't like operating on big fat, heavy, overweight Pacific Islanders because it is dangerous, they quite often say to them, 'I can't operate until you go and lose 20 kilos'. This is what happens."

As seen in Chapter 4 other literature has acknowledged the presence of co-morbidities contributed to longer waits by patients, especially from Maori and Pacific Islanders and lower socio-economic groups (McLoed et al., 2004, McLeod et al., 2004b).

Low Decile Effects

The other major finding from Chapter 7 was that patients from lower socio-economic backgrounds seem to have delayed access to elective treatments. This can result because people from lower socio-economic backgrounds have higher environmental health risk factors such as smoking, poor quality housing, and poor diet which lead to more serious and complicated conditions as discussed in Chapter 2 Specialist B stated:

"If you are a vascular surgeon in a low decile area those patients with vascular problems are much more likely to have other issues. They are more likely to be diabetic, they are going to be overweight, have respiratory disease, therefore, the total burden of illness for the patient is so much greater and what that means is your surgery becomes more time consuming and much more complex, you get much higher re-admission rates following your complications and re-admission rates block up your hospital beds and all of a sudden you find that your waiting list goes out. So those are the sort of factors that are very important to take into consideration."

As specified by Specialist B literature and reported in Chapter 4 patients from a low socio-economic background also tended to suffer from co-morbidities with the result that they are usually subject to longer waiting times (McLeod et al., 2004a). McLeod et al (2004b) also noted that socio-economically disadvantaged patients tend to move home frequently and are thus more likely to be lost in the booking system.

Social and Ethnic Bias

Although not mentioned in any one of the interviews, social and ethnic bias is a factor that may play a part in explaining the higher waiting times that are experienced by highly deprived as well as Maori and Pacific Island patients. Lower rates of diagnosis, referral and treatment have been associated with groups of higher material deprivation in the UK, France, Denmark, Scotland, Switzerland and Japan (Jack et al., 2006, Berchi et al., 2004, Norredam et al., 1998, Rapiti et al., 2006, Fukuda et al., 2005, Barry and Breen, 2005). Ethnic bias has also been found relating to disproportionately low diagnosis and treatment rates in African American and Hispanic cancer patients in the US (Haggstrom et al., 2005). The results of this thesis provide evidence that this ethnic bias may be occurring for Maori and Pacific patients as they were seen to wait a significantly longer time for elective surgery in some DHBs.

9.2.3 Contextual Differences that Affect Public Waiting Times

Objective Three - Key Findings

In achieving objective three as described in Chapter 8, contextual factors were examined to determine waiting times within the NZBS. Initially, a measure of urban-rural classification was used to determine whether waiting times varied considerably for patient access to urban services. Unfortunately, the results showed only small differences in a patient's access to care depending on their proximity to urban amenities.

Other analysis set out to understand how the public hospital sector interacts with private hospitals and the effect on public access to the NZBS. Findings show how services that are provided privately can be shown as a substitute to publicly funded elective surgery. Patients from a low socio-economic background were found to have lower admission rates to private hospitals representing an income effect in the market for private hospital care. Also, results show that Maori and Pacific Islanders suffer lower access to these services, which may be explained by the over representation of these communities in lower socio-economic groups. Furthermore, significant results were found when private hospital admission rates were correlated with public waiting times. DHBs with high private hospital admission rates were subject to longer public waiting times and vice versa.

With feedback from medical specialists and hospital administrators the author was able to further discuss some critical factors as to why this may be the case:

- **Private health insurance** ownership is an important factor because membership varies geographically by socio-economic status (Schoen et al., 2000, Blumberg, 2006).
- **Specialist behaviour** needs to be taken into account as the literature indicates that some specialists prefer working in private hospitals to maximise personal income (Howden-Chapman and Ashton, 2000, Yates, 1995);
- **Public-private contracting** influences waiting times where there are higher private hospital admission rates.
- **ACC** payments for surgical treatments required after an accidentals impact on public waiting times as specialists have to divide their time between public elective operations and ACC funded operations.

Private Health Insurance Ownership

In Chapter 8 admission rates between public and private surgery were seen to substitute for each other. Results were not statistically significant but showed that for the most part DHBs with low public admission rates tended to have relatively high rates of private hospital admission as shown in Figure 49. This seems plausible in a two-tiered health system like New Zealand's. The more private health insurance ownership and, therefore, private provision undertaken in an area could plausibly help to reduce the demand within public hospital systems. This understanding is expressed in Specialist B's comment:

"The other issue that probably has an effect on public waiting lists is the proportion of patients within a certain area that are privately insured, so for example, if you are living in Christchurch, the proportion of privately insured patients is much higher than in Wellington, for example, and therefore you will find that the private sector can take a lot of the burden off the public hospital system. If you are in a very low decile area, for example, somewhere past the Hawkes Bay, you may find a far lower proportion of patients that are insured within that area, so that will have an effect. Therefore, the greater burden falls on the DHB."

In fact DHBs, such as Capital and Coast and Canterbury, have among the highest waiting times in New Zealand, and hospital admission results show patients of these DHBs to be

amongst the highest users of private hospital care. Also, as Specialist B suggests, the population within the Hawkes Bay and Tairawhiti DHBs do tend to have less access to private health insurance and therefore private health care. But, this does not seem to be increasing the burden on these DHBs. Instead, results show that these areas display vastly lower waiting times when compared to highly insured areas such as Canterbury. There must be some further explanation behind these results.

Specialist Behaviour

The literature discussed throughout Chapters 2 to 4 shed light on the influence specialists have on public hospital systems as they look to balance workloads between public, private and in some cases academic responsibilities. Some authors (Howden-Chapman and Ashton, 2000, Yates, 1995), have reported conflicts of interest for some specialists who look to profit by doing maximum workloads within private hospitals where they carry out simpler operations leaving more complex operations for the public system to deal with. Administrator B discusses his experience with specialists' ability to manipulate the system for personal gains:

"I do think there are colleagues that try to game the system but I don't think the system is easily 'gamed' and a lot of what people project onto it. I think many aspects of the nature of when people can get operating times is so far beyond what the surgeons can call it's not funny. I'm not saying they are not busy up the road doing what they are doing but I don't know that, I think this is partly to fill in the time that they don't have in public. If you have long waiting times then there should be expectation on the public side of the system to fix that. The Ministry has set those expectations and they have their own formula for it."

From the qualitative feedback received it seems as though specialists have little control to manipulate the system for personal benefit. All the specialists interviewed had particular contracts with the DHB which specifically set out when, and for how long they work in public, how long they can work in private around public obligations and in some cases also have time designated for academic appointments. Specialist A outlines the division of time he spends between each of these obligations:

"I have a set day that I operate in public, Monday at Kenepuru Hospital, that's my public hospital day. Then I have other days during the week when I work in private but I don't not do work in public when I am working in private. I still do my one day a week in the public

hospital operating theatre to fulfil my contractual obligations to the DHB. I'm contracted to work four half days a week for them. I have a joint contract with the University of Otago and the DHB, five half days with the university and the other half day is when I'm allowed to do my private practice. But then they let me do an extra half day of private practice as well."

This insight shows that it is less about the way the specialist decides to divide his or her times and more about the contractual relationships that are formed between them and the DHB. If the DHB could afford to employ individual specialists for longer, you would expect that the DHB could negotiate new contracts but in the long term, specialists cannot waiver from their contractual obligations. Administrator B points out that:

"The behaviour of the surgeons is different, but I think you will find from [sic] most specialists is they have less control over their waiting lists than most people think. There is this thing that surgeons are putting operations off because they are busy in private. I think it will also be related to what is available here. For instance, much of eye surgery is contracted out to the private sector. At one stage more than half of stuff was done outside the hospital grounds."

Public/Private Contractual Relationships

One thing that has a particularly large impact on public waiting lists is the contractual arrangements between individual DHBs and private hospitals. As Administrator A points out, a significant number of DHBs have been contracting out elective surgery to the private sector because they have not had the resources to do it in the public. This is especially the case in DHBs with less sophisticated hospital facilities, areas of the country like the west coast of the South Island, Tairawhiti, Northland or Taranaki. These DHBs buy private hospital services from providers in main centres such as Auckland, Wellington and Christchurch. When this occurs specialists of the DHBs located in the main centres such as Waitemata, Auckland, Counties Manukau, Hutt Valley, Capital and Coast and Canterbury have more work on their hands and may choose to do less public work and more private work for better money in the private hospital sector. In this case there would be fewer surgeons available for work in public hospitals which may influence the inflation of waiting times in these DHBs. Specialist C said:

"I think New Plymouth outsources it, typically small centres have done that for logistical reasons because they are not doing huge volumes of ophthalmology it is more efficient to do it at a private hospital."

This also occurs in the larger centres as Specialist B states:

"The ability of the DHB to buy operating time from the private sector, which is what they do, has a huge impact. With Capital and Coast health, the ability of them to contract out cardiac surgery, ENT services, I think they probably contract out cataract surgery as well which has a huge impact on their own waiting lists, it is a very big factor."

One thing that has a large effect on the amount of surgery that is outsourced to the private sector is the enforcement of ESPI targets where the Ministry of Health will threaten to reduce funding to individual DHBs in the case where they do not meet their obligations. Specialist C comments further:

"One of the other things that they tend to do is suddenly they will contract a whole lot of surgery out to the private sector in an attempt to keep the waiting lists down to get extra funding and they get in the situation where they have 400 cataracts to do in three months and they become price-takers rather than price-makers, in other words you will get two or three people saying 'We can do that but you are going to have to pay us this much'. Whereas, if they dribbled them out through the year people would say 'Well I will do it for whatever you want because it fills up my time', it is not well managed. The public sector does not manage its need for resources all too [sic] *well."*

As Specialist C has described the DHB becomes a price-taker rather than a price-maker when they have no choice but to tender out services to the private sector. In cases where the local private hospitals cannot sustain demand and if the DHB is in a rush to get surgery done it is not unheard of for management to send people offshore for treatment, which can be an expensive task. Administrator B reflects on one occasion where this was the case:

"In 2007-08 the backlog for elective surgery was huge, and we had to send about 50 odd people to Sydney to have operations."

Specialist B comments further on this:

"I think it happens quite often and it is just a reflection of the pressure that the DHBs are under, so they will go to great lengths to get waiting lists down, for sure."

Accident Compensation Corporation (ACC) Effects

Administrator A notes over 50% of elective orthopaedic surgery is paid for by the ACC, and some of that is done in public under contracts but most of it is undertaken in private hospitals. The author has removed all ACC cases from the NBRS dataset to remove the bias that would be encountered with so many patients utilising private care under ACC. (See Chapter 5, section 5.3.2.) Because specialists are having to commit time to operate on these ACC cases, this has an indirect effect on the amount of time they are available to undertake surgery within the booking system. So the amount of ACC patients in a DHB may affect waiting times as the same surgeons are operating on both booking system and ACC patients. Administrator A comments on contractual arrangements for ACC:

"About 80% of ACC surgery is done in the private hospitals, but it is not the patient's choice, they would have it done under a contract that is usually held by the private hospital. They basically bid for a contract. Say in Wellington, Wakefield would have a contract, Southern Cross would have a contract and the public hospital would also have a contract. ACC think that this keeps the private sector honest and competitive. Under the ACC contract they are paid by ACC at the contract price that they have agreed. But when they are doing contract work for the public sector, yeah, they do get screwed by the DHBs as much as possible, they get forced down in terms of price, I understand. But not hugely because the DHBs concern is to get the work done. But ACC are skewing things at the moment."

ACC has significantly decreased the number of clients for surgery in the last 18 months so even though someone might have had an accident ACC have decided that it is not an accident and therefore they are not going to pay. These people still need their operation, and no one is certain what is happening to those patients. They would have to go onto the waiting list but they are usually of fairly low priority, so they probably don't even get on the waiting list and we don't know what is happening to them. In all probability they enter the booking system at FSA and will not meet the CPAC score to proceed to surgery so enter the residual waiting list, as described above (Administrator A).

9.3 Theoretical Implications

This thesis has made an important contribution to knowledge of the social and geographical inequalities evident in the provision of elective services in New Zealand. Through a mixture of quantitative and qualitative research this work has found significant differences in public access for a variety of communities in different areas of New Zealand. No health geographer to the author's knowledge has undertaken research on the rationing of elective surgery through the New Zealand public hospital sector in the manner set out in this thesis. Geographers have long approached issues of health service delivery but focus has often been limited to an analysis of 'change' within hospital systems, specifically, assessing pressures that have led governments to adapt health systems in order to meet the needs of society (Barnett and Copeland, 2009, Barnett and Barnett, 2009). Some research has examined geographical differences in hospital resources, including Roemer's Law, through analysis of the number of hospital beds in a region and comparing this with hospital demand or universal measures of need (Brown and Barnett, 1992). Few studies have taken account of public hospital service provision following the introduction of the NZBS in 1998 the way that this thesis has.

As far as rationing goes, geographers have discussed the rationalisation of hospital services (Barnett, 1999), and to some extent actions of filtering in PHC systems (Brown, 1988, Blank, 1994), but they have not approached the contentious issue of waiting times. The examination of waiting times in elective surgery has been left to sociologists (Spicker, 2008, Roake, 2003), economists (Frech and Hopkins, 2004) and public health researchers within the medical profession (Howden-Chapman and Ashton, 2000, Derrett et al., 2009). Little research has attempted to recognise geographical variations in health service delivery between provider organisations with the exception of Derrett et al's (2009) study which compares waiting times across New Zealand DHBs for several elective surgical procedures. This thesis provides detailed spatial analysis of the performance of different DHBs against each other and also shows comparisons with Australian results, differences which have not been observed from any other source.

Much research has been published by public health commentators on the implementation of the NZBS since 1998. Most have commented on equity of access to public hospital systems since the introduction of the new clinical prioritisation tools and processes (Howden-Chapman and Ashton, 2000, Gauld and Derrett, 2000, Roake, 2003, Derrett et al., 2003). A

body of qualitative research was undertaken which reported on clinicians' attitudes and reflections having had to deal first hand with the new clinical prioritisation criteria tools (McLeod et al., 2004a, McLeod et al., 2004b, McLoed et al., 2004). This research has raised issues of inequality between different ethnic and socio-economic groups in facing different levels of access to elective treatments. As seen throughout other literature (Howden-Chapman and Ashton, 2000, Yates, 1995), analysis also found evidence that some specialists were manipulating the booking system for personal benefit. Findings from this study have suggested that there are large inconsistencies in the way that patients are prioritised for surgery as well as wide variation in specialists' use of national scoring tools. Feedback from interviews indicated that many DHBs have dropped patients off waiting lists as prioritisation criteria toughened, many patients of which would have previously been eligible for surgery in the public hospital system before 1998 are now left untreated and managed through the primary health care system.

Geographers have examined theories of inequality and exclusion in relation to environmental risk and other related vulnerabilities. They have also found in many cases that people living in relatively deprived circumstances suffer higher levels of morbidity and mortality amongst the remainder of society (Dew and Kirkman, 2007a). Some have shown that these individuals suffer poorer access to health services, in particular to PHC systems (Barnett and Lauer, 2003). Much of the analysis takes account of the income effect that limits patient access to PHC services, specialist consultation and private hospital treatments (Schoen et al., 2000). Geographers have also looked as the way that Maori and Pacific Islanders also have poorer access to health services through their lower socio-economic status (Brown, 1999) and higher levels of morbidity when compared to the remainder of the New Zealand population Salmond and Crampton, (2000). To the author's knowledge, no geographer has considered the effects of ethnicity and deprivation on the individual process of prioritisation and referral or waiting times for elective surgery. This thesis has found that certain ethnic minorities, particularly Maori and Pacific Island people and patients from low socio-economic communities have significantly longer waiting times in some DHBs.

In comparing public/private interaction in the market for hospital care and the effects on public hospital systems, one New Zealand sociologist has a particularly large influence. Fougere (1974, 2001) blames the private hospital and medical insurance industry for the poor performance of publicly funded hospital systems. The only geographers that are known to have reached a similar conclusion are Barnett and Barnett (1989) who commentated on

this during their work on the privatisation of hospital systems and they found that higher private hospital admissions were associated with longer waiting lists in the public hospital sector. Twenty years later Derrett et al (2009) published a similar study which compared New Zealand waiting times for specific procedures (total joint replacement, prostatectomy and cataract operations) with hospital admissions data for the public and private sector over the period 2000 to 2005. Derrrett et al (2009) confirmed that waiting times for each procedure increased in line with higher levels of private practice in the DHB of origin. Derrett et al (2009) also illustrate how highly deprived individuals have lower private admission rates than the affluent and tend to rely on the public system for elective surgery. This research has shown similar results noting that in DHBs with high private admission rates, patient were subject to longer waiting lists in the public hospital system.

The author based certain aspects of this thesis on Derrett et al's (2009) work but instead focused on higher level analysis across the NZBS for a more recent period. There has been further examination of geographic differences and the author has added ethnicity and a number of other measures in relation to access for public treatments and conducted similar public/private analysis relevant to the entire public booking system. This thesis supports the hypothesis that private practice places strain on public hospital resources and further reduces access to hospital services for vulnerable populations, particularly Maori and Pacific and highly deprived patients.

9.4 Policy Implications

This next section will discuss a few policy implications and recommendations that have arisen as a result of this thesis. Firstly, the inconsistency of CPAC tools will be examined and recommendations are made to improve the geographic equality of access to hospital services so that the likelihood of treatment does not depend on where a patient lives. Secondly, the research shows that there is no universal measure of need for elective surgery in New Zealand that takes into account patients that fall onto the residual waiting list, so suggestions are made to create a clinical needs register would include every patient that gets referred from their GP to specialist care. Faults in the Ministry of Health's reporting and penalty systems are mentioned which encourage DHBs to do the minimum required and support inefficient use of the private sector. A recommendation is made that there be separate operating theatres for elective and acute operations to avoid delays in the booking system as a response to several comments made by hospital specialists and administrators.

Finally, about ways to best make the best use of a private hospital sector that specialises in the market for elective services.

Clinical Priority Assessment Criteria (CPAC) Tools

The problem with CPAC tools at present is that they are not being used universally across DHBs. In 1998 when the booking system was introduced one of the key principles was to increase equality across New Zealand by using universal clinical priority tools. Below are the recommendations for the Ministry of Health:

- Introduce national scoring tools for the use of specialists, nurses and administrators individually by specialty.
- Enforce the use of the CPAC tools for each DHB. This may go some way to reducing the inequality that is seen for waiting times between DHBs. It will also allow better evaluation of how individual DHBs perform against other DHBs simply by observing CPAC score thresholds that are set for patients' commitment to treatment.

Measure of Need

This research has shown that there is no meaningful way of recording clinical needs for elective surgery that is currently being practiced by each of the DHBs. Because CPAC scoring systems are nationally inconsistent, such scores are meaningless when compared with one another. If CPAC scoring tools were consistent across all DHBs, administered and recorded accurately, need would be able to be registered nationally for meaningful analysis. This would ensure consistency and transparency for the Ministry of Health to judge how well each DHB is delivering services. Transparency is one of the main goals which has never been realised since the NZBS was created in 1998.

The thesis has also found that there are no records kept of patients being dropped from the booking system and sent back to their GP. Although some patients may not have required surgery as warranted by the specialist, others return to their GP because they did not reach the financial threshold to advance to surgery within the 18 months active review period, as shown in Figure 16. These patients form part of a hidden group that make up the residual waiting list. If DHBs kept a record of how many patients are falling out of the booking system (referred back to primary care) this would give a better understanding of the needs that New Zealand's population has for elective surgery.

Ministry of Health Reporting Systems

The Ministry of Health's ESPI reporting systems are not operating to provide a correct measure of need and encourage efficient service delivery within each DHB. There are three reasons why this is the case. The first is because ESPI target five which states that 'DHBs should not have any more than 5% of patients waiting more than 180 days between when the DHB gives a commitment to treatment and date of surgery' gives DHB management the ability to adjust patients' commitment to treatment. The second is that DHBs have the ability to manipulate waiting times by continually altering the financial threshold at which patients come on or drop off the waiting list, depending on whether the DHB is meeting targets. Finally, penalties for not meeting ESPI are forcing DHBs to make inefficient decisions such as sending large numbers of patients across to the private sector here and abroad to avoid MoH sanctions. The author recommends:

- Switching the, commitment to treatment for ESPI 5 to first specialist assessment (in particular for those patients that end up meeting the score required to proceed to surgery). This would give a truer measure of waiting time and take away the ability for DHBs to manipulate waiting lists the way they do currently.
- Setting a CPAC score threshold for patients to receive treatment that can only be changed every 180 days by a DHB. This would give patients assurance as to when they will receive treatment.
- Requiring DHBs to utilise private hospital resources throughout the year to avoid large volumes of surgery being forced through at the end of each ESPI reporting period.

Public Hospitals

Feedback from the specialists and administrators suggested that the amount of work associated with trauma and acute surgery cases has a huge effect on the ability to deliver of elective surgery. It has been suggested several times that separate theatre suites be set-up with some designated for trauma and acute events alone and with other theatres designated specifically for the purpose of elective surgery. It is understood the demands and importance of some trauma events absorb large amounts of resources and in some cases the cancellation of elective surgery cannot be avoided.

Smart Use of the Private Hospital Sector

There is argument against the expansion of New Zealand's private hospital sector. While this thesis has confirmed that the private hospital system has been of some detriment to the public system in the inflation of waiting times, much argument has come from executives like Terry Moore, President of the *New Zealand Private Surgical Hospitals Association* (NZPSHA), who claim that the private hospital sector can provide advantages by complementing the public sector in many respects. In the past the NZPSHA has promoted a 'balanced health care model' in which "…*the public and private health systems work together co-operatively to meet the health care needs of New Zealanders*" (Moore, 2011). The ability for private hospitals to specialise in elective surgical procedures with their dedicated clinical teams and purpose-built facilities means they are very efficient providers of elective interventions. As these hospitals are profit-maximising private organisations it is in the private provider's interest to maximise the difference between its costs and the price it charges. For this reason it is not uncommon for the public hospital sector to be held to ransom by private hospitals and be charged a price well above what it costs to provide these treatments. Therefore, it is crucial that DHBs negotiate a fair price with private providers when they choose to outsource surgery. If public providers maintain the ability to negotiate fair prices with the private sector this balanced care model makes sense but if private hospitals inflate the price of their services, the complementary role of private medicine becomes unsustainable.

The public hospital system sometimes disadvantages itself through its rationing processes which restrict the most efficient use of the private hospital sector. In this case the problem lies not with the private health care practices but through rigid public prioritisation processes. There are some instances when CPAC scoring system disadvantages patients who are willing to utilise the private sector. Specialist C provided an example of how this can be the case in ophthalmology; some patients are willing to get one eye operated on in the private sector and have the second done in a public hospital with the understanding that public hospitals are short of resources. But the problem is if they get one done in private their CPAC score falls below the threshold. So they have to wait to get the first one done in the public sector before getting the other done in the private system. Patients like those described by Specialist C recognise that the public system works under a rationing system and are willing and able to pay for one eye to be treated, but because of the rigid rules that

apply to the scoring procedure they risk not having the second eye done and have to wait to get both eyes treated in the public system.

9.5 Recommendations for Future Studies

Looking back at this research it was unfortunate that the analysis was not able to be conducted by specialty to correlate admission rates to waiting times as a result of data being incorrectly coded or not recorded in the NMDS dataset by DHB administrators. If the author had known this at the outset, when planning the research, procedure codes that which are correctly coded could have been used to compare individual operation waiting times to the equivalent admission rates.

It would be very useful, as others have described (Gauld and Derrett, 2000), to examine the residual waiting list either throughout the country or locally in one DHB. Fiona Pimm, a hospital manager for Canterbury DHB who spoke to the author during the planning of this thesis said that the Canterbury DHB was retrieving information on all patients referred back to primary care. This would provide an interesting dataset to analyse, in order to understand the status of the residual waiting list.

Some suggestions were received from interviewees for analysis to include in the study. Unfortunately, because this thesis was limited to one year in duration the author had to limit the scope of the project and was unable to include some of the recommended analyses. These suggestions are discussed below along with some other comments on the way this research could have been done differently.

Administrator B commented that it may have been useful to talk to surgeons and administrators from a selection of DHBs to try and understand the way different DHBs administer waiting times and to find out how interconnected the DHBs are throughout the regions. As a research project this could be undertaken using in-depth qualitative interviewing between neighbouring DHBs, for example comparing Canterbury with South Canterbury DHBs. For a more in-depth study this could be undertaken nationwide, or in either the North or South Island to a gain greater understanding of inter-DHB contracting and specialist work practices.

Administrator B also recommended establishing the number of specialists employed in each DHB by specialty and correlate this to waiting times. More depth could be provided to this

research if each specialist's work time was recorded by how many days they work between the public and private hospital sectors. The scope of such a project if undertaken nationally could become unmanageable so the analysis could be limited to one surgical specialty e.g., orthopaedics. This would provide an excellent measure of the labour resources that are available to each DHB and would provide further insight into the effect of the private sector on public waiting times.

Specialist B suggested making correlations between the percentages of population privately insured against waiting times experienced in the public sector for each DHB. Analysis such as this would be very useful but there may be limitations on access to private insurer membership data as these private organisations look to retain a low profile.

All the medical specialists and hospital administrators interviewed were impressed with the results that were produced during the quantitative analysis sections of this thesis. This thesis has provided analysis and reported on an important area of health services geography. Although, there is much more scope for other researchers to study discover and report on the rationing of elective services in the New Zealand public hospital system.

9.6 Conclusion

The New Zealand 'Waiting Times Project' was envisaged to improve equity of access to public elective surgery by increasing the consistency and transparency of prioritisation processes. The reality is that since 1998 when the booking system was introduced implementation has not followed the key strategies that were originally set out. Prioritisation criteria vary significantly between New Zealand's 21 DHBs providers, which mean there is no universal measure of need. From 1998 thousands of patients were dropped from waiting lists as prioritisation criteria tightened, creating a residual waiting list of patients that require surgery but do not meet the criteria to receive it. At the same time DHBs have filtered away surplus resources to fund perceived higher priority areas, such resources could otherwise have been available for elective procedures. DHBs are driven by organisational pressures focused on meeting targets and specific goals that are set by the central funder of health and disability services, the New Zealand Ministry of Health.

The New Zealand health system was the first in the world to introduce comprehensive social security legislation in health and the government continues to operate a single payer tax-

funded public health system. Such systems usually favour principles of equity, to ensure universal access and impose pressures of efficiency and in some respects effectiveness. The NZBS is an explicit form of health service rationing that restricts patients' access to publically funded surgery. Governments that operate such tools must ensure that they operate in a fair and equal way to cater for all their citizens. This thesis found that this was not the case in New Zealand during the period 2004-2007. Waiting times were shown to vary substantially across New Zealand with people of high material deprivation as well as Maori and Pacific Islanders waiting substantially longer for treatment in some regions. Also, waiting times were shown to be highest in DHBs that have more private practice. The reality is that there are many people who suffer with often chronic conditions who would truly benefit from treatment but who may never meet the priority criteria for surgery. Unfortunately these individuals tend not to be able to afford private health insurance and are left to suffer rather than seeking care through private hospital facilities.

10 Appendix

Appendix 1

OPHTHALMOLOGY

National Clinical Priority Assessment Criteria (CPAC)

Patient ID: Complete patient details or place patient sticker here

Nat. Hospital No.: _____ Consultant: _____

Name: _____ D.O.B. ___/___/___

Address: _____

_____

Name of Assessor: _____

Date of Assessment: ___/___/___

Diagnosis: _____ **Procedure:** _____

Category Definitions :	1. Immediate (91 - 100 points)	- *within 24 hours*
	2. Urgent (71 - 90 points)	- *within 4 weeks*
	3. Semi - Urgent (51 - 70 points)	- *within 12 weeks*
	4. Routine (21 - 50 points)	- *within 6 months*
	5. Deferrable (<20 points)	- *deferrable*
	6. Staged / Planned	- *management to achieve optimal outcome*

NATIONAL REFERRAL GUIDELINES : OPHTHALMOLOGY

Disease or Diagnosis	Category	Score Range	Score
Ocular Trauma			
Acute trauma – priority determined case by case	1 or 2	71-100	
Blowout fracture	2	71-90	
Infections			
Endophthalmitis – usually following penetrating trauma or surgery	1	91-100	
Acute keratitis	1	91-100	
Orbital cellulitis	1	91-100	
Acute dacryocystitis	1	91-100	
Chronic dacryocystitis	4	21-50	
Other non-sight threatening infections	3 or 4	21-70	
Tumours			
Malignant – intraocular	2	71-90	
– of the lids (low grade BCC's)	3	51-70	
Orbital tumours – suspected malignant	2	71-100	
– low grade malignant or benign	3 or 4	21-70	
Other tumours	2, 3 or 4	21-90	
Enucleation/Evisceration			
Malignant tumour or severe pain	2	71-90	
Risk to other eye	2	71-90	
Cosmetic	4 or 5	0-50	
Retinal Disease			
Retinal detachment with macula not detached	1	91-100	
Retinal detachment with macula detached	2	71-90	
Vitreous haemorrhage	2 or 3	51-90	
Retinal pathology requiring laser photocoagulation	2	71-90	
Retinal holes tears etc	2	71-90	
Retinopathy of prematurity	2	71-90	
Diabetic retinopathy	2 or 3	51-90	

NATIONAL REFERRAL GUIDELINES : OPHTHALMOLOGY			
Disease or Diagnosis	**Category**	**Score Range**	**Score**
Glaucoma			
Acute glaucoma	1	91-100	
Chronic glaucoma with high risk of visual loss	2	71-90	
Neovascular glaucoma	2	71-90	
Glaucoma with pain ++	2	71-90	
Chronic glaucoma with low risk of visual loss	3	51-70	
Cataracts			
Lens induced glaucoma	2	71-90	
Cataract extraction required in order to treat posterior segment.			
disease e.g. Diabetic retinopathy	3	51-70	
All other cataracts see separate scoring system	4 or 5	0-50	
Corneal Disease Requiring Keratoplasty			
Score as for cataract but add 20 points for long visual recovery	4	0-70	
Squints			
Risk of amblyopia or loss of BSV	3	65	
Causing diplopia	3	55	
Cosmetic with impact on psychological development	4	45	
Cosmetic >20 prism dioptres with psychological impact	4	35	
Cosmetic >20 prism dioptres	4	25	
Cosmetic< 20 prism dioptres	5	10	
Ptosis			
Paediatric threatening vision	3	51-70	
Adult affecting vision	4	21-50	
Cosmetic - severe	4	21-50	
- other	5	0-20	
Epiphora			
Childhood	3	51-70	
Adult - troublesome	4	21-50	
Ectropion/Entropion			
Entropion	3	51-70	
Ectropion - with corneal pathology	3	51-70	
- without corneal pathology	4	21-50	
Pterygium			
Threatening vision	4	21-50	
Non-sight threatening	5	0-20	
Staged Procedures			
EUA, radiation plaque, skin flaps, strabismus re-operations,			
vitreo-retinal surgery, etc	6	Staged	
Refractive Eye Care			
Amblyogenic refractive errors	3	51-70	
Low vision aids	4	21-50	

***Notes** : If the patient requires more than one procedure the score should relate to the most significant procedure.*
If there is a conflict between the patient's criteria score and generally accepted clinical practice then the latter should prevail.

OPHTHALMOLOGY

National Clinical Priority Assessment Criteria (CPAC)

FOR CATARACT SURGERY

Patient ID: Complete patient details or place patient sticker here

Nat. Hospital No.: _____ Consultant: _____

Name: _____ D.O.B. __/__/__

Address: _____

_____

Name of Assessor: _____ **Date:** __/__/__

Operative Eye: ☐ L ☐ R

Section 1: VISUAL ACUITY SCORE

FELLOW EYE	VA	6/9	6/12	6/18	6/24	6/36	6/60	CF/HM
	6/9	2	4	6	7	8	9	10
	6/12	4	8	10	11	12	13	14
	6/18	6	10	14	15	16	17	19
	6/24	7	11	15	21	22	23	25
	6/36	8	12	16	22	26	28	30
	6/60	9	13	17	23	28	32	34
	CF/HM	10	14	19	25	30	34	35

N5	0
N6	1
N8	2
N10	3
N12	5

Max 5 points

Distance Vision Score (Max 35 Points) → ( )

Section 2: CLINICAL MODIFIERS

⇨ If BCVA better than 6/24 in eye to be operated on, add 5 points only if posterior sub-capsular cataract present - to offset good VA

⇨ If non-cataract pathology reducing vision, subtract up to 50% of VA points
(Posterior segment disease requiring prompt treatment to be ranked by disease to be treated)

( ) Max 5 points

Section 3: SEVERITY OF VISUAL IMPAIRMENT

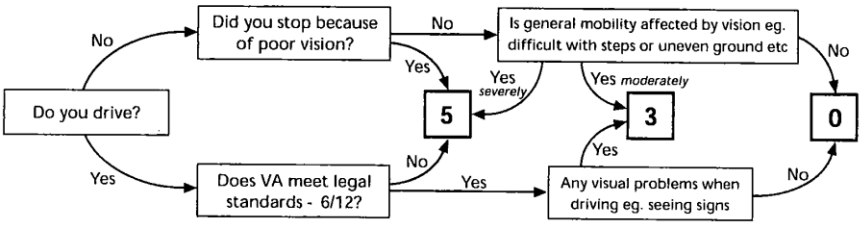
A. Gross visual function: Any difficulty, even with glasses, recognising faces, watching TV, cooking, playing sport/cards etc.

POINTS: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5

No difficulty — Difficult — Impossible

( ) Max 5 points

B. Driving/Mobility: Choose one pathway



( ) Max 5 points

Section 4: ABILITY TO WORK, GIVE CARE, LIVE INDEPENDENTLY

POINTS: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5

No difficulty — Difficult — Impossible

( ) Max 5 points

Section 5: OTHER DISABILITY

POINTS: 0 - - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5

No disability — Moderate disability — Severe disability

( ) Max 5 points

State disability: _____

Sections 4 & 5 only apply when sections 1 + 2 + 3 < 50 (Maximum points allowed)

The maximum score is 50 points **TOTAL SCORE** ( )

Appendix 2

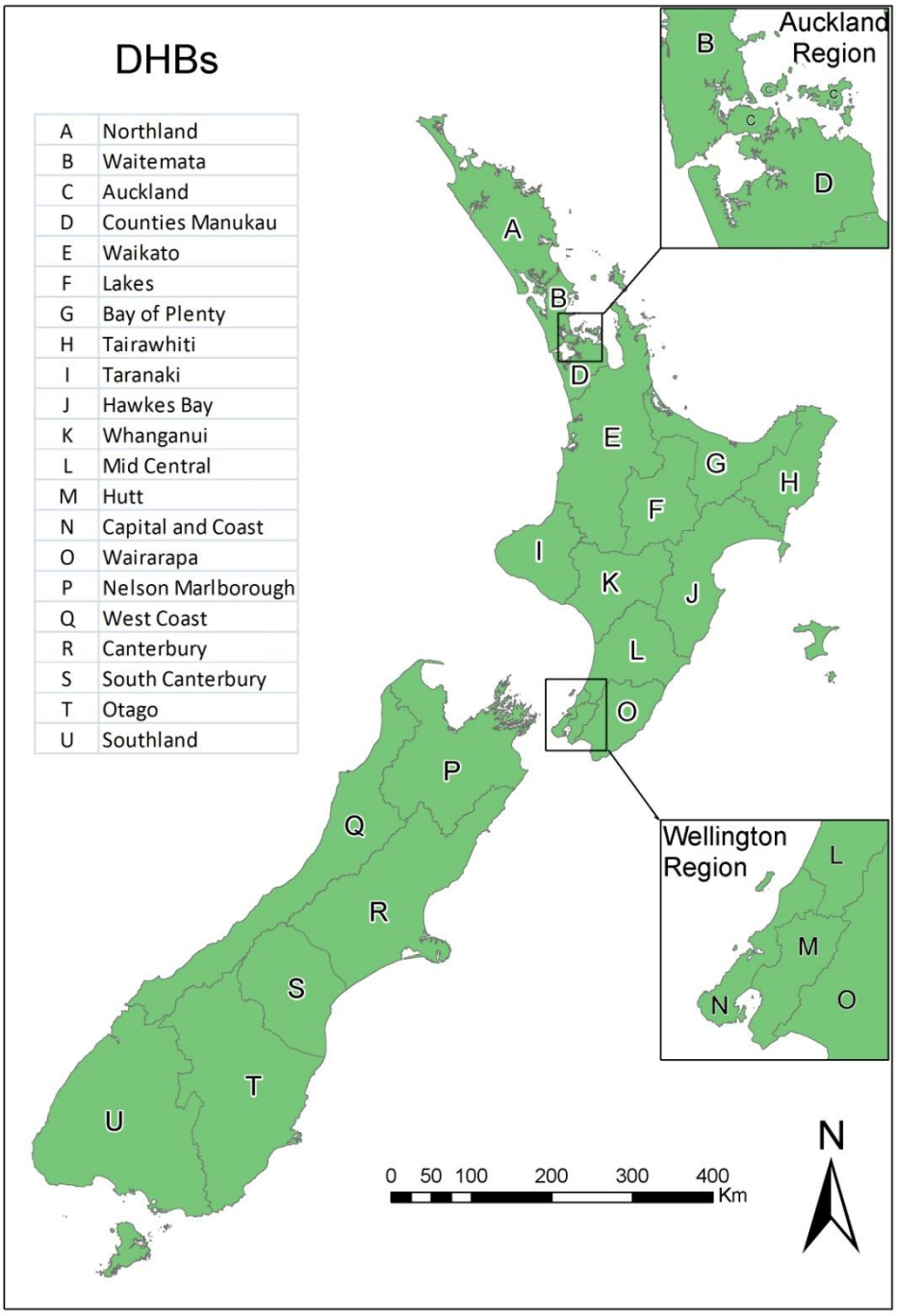


Figure 60: Map of District Health Boards (DHBs)

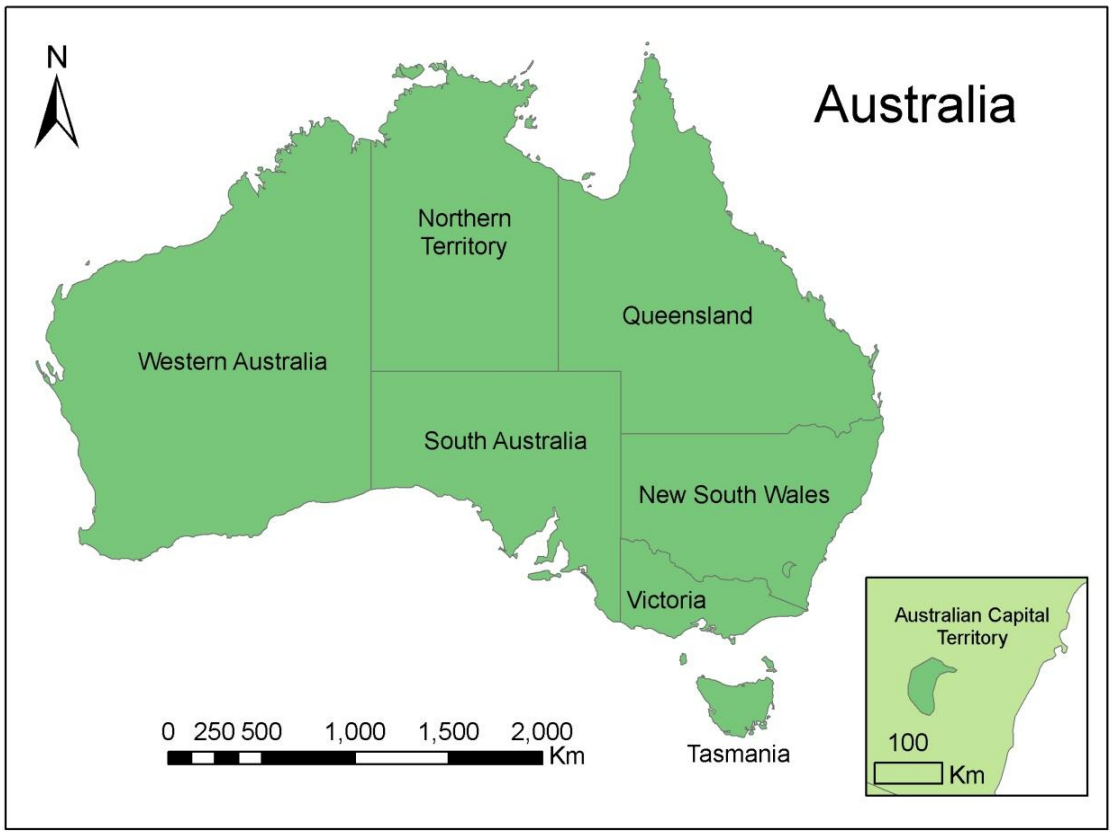


Figure 61: Map of Australian States and Territories

Appendix 3

DHBs Age	0-14	15-24	25-44	45-64	65-74	75+	Totals
Northland	4003	1092	4356	9110	5909	5418	29888
Waitemata	11203	3414	13425	17336	11111	12995	69484
Auckland	7723	1981	7539	9593	5572	7006	39414
Counties Manukau	12581	2979	11487	18189	10176	9717	65129
Waikato	7538	2267	7862	13966	9671	10628	51932
Lakes	2720	837	3522	5057	3036	2932	18104
Bay of Plenty	4850	1672	6552	11367	8069	9149	41659
Tairawhiti	1448	489	1754	2734	1413	1401	9239
Taranaki	2448	1216	3511	5828	4211	4697	21911
Hawkes Bay	3954	1595	4435	7735	5066	5185	27970
Whanganui	2162	914	2950	4273	2699	2975	15973
Mid Central	3540	1395	4190	6059	4181	4346	23711
Capital and Coast	3573	1303	4760	7409	4085	4086	25216
Hutt	5664	1805	5547	6980	4294	4571	28861
Wairarapa	849	381	1281	2047	1316	1310	7184
Nelson Marlborough	3183	1492	4660	7722	4778	5522	27357
West Coast	872	516	2057	3007	1441	1162	9055
Canterbury	8126	4175	12727	17568	10252	10824	63672
South Canterbury	1519	682	2252	3299	2231	2317	12300
Otago	3371	1924	4605	8015	5563	6915	30393
Southland	3114	1006	3094	3866	2468	2489	16037
Overseas	63	31	75	110	47	38	364
Other	11	0	9	9	5	11	45
Totals	94515	33166	112650	171279	107594	115694	634898

Table 28: Total Public Elective Hospital Admissions 2004-2007 (NMDS)

DHBs Age	0-14	15-24	25-44	45-64	65-74	75+	Totals
Northland	670	666	2092	4906	2111	1745	12190
Waitemata	4074	2645	7220	9970	2752	1816	28477
Auckland	3841	2348	5936	6538	1736	1236	21635
Counties Manukau	2249	1456	3769	4996	1306	716	14492
Waikato	2548	1951	6234	12286	4565	3354	30938
Lakes	598	529	1435	3689	1615	1309	9175
Bay of Plenty	960	621	2668	6550	2846	1716	15361
Tairawhiti	105	97	359	1168	508	552	2789
Taranaki	70	109	320	690	252	120	1561
Hawkes Bay	717	534	1945	4015	1361	1128	9700
Whanganui	137	92	319	601	296	272	1717
Mid Central	583	649	2099	3870	1378	808	9387
Capital and Coast	2134	2628	8450	13709	5413	4489	36823
Hutt	1180	1020	3240	6431	2435	2082	16388
Wairarapa	225	118	510	1536	667	508	3564
Nelson Marlborough	445	457	1574	3332	1066	658	7532
West Coast	120	76	269	563	180	110	1318
Canterbury	5515	3384	11411	22500	8728	8114	59652
South Canterbury	334	210	826	1785	614	564	4333
Otago	1498	1938	3829	6437	2265	1805	17772
Southland	1015	813	3055	5379	1914	1487	13663
Overseas	330	181	543	752	357	189	2352
Totals	29348	22522	68103	121703	44365	34778	320819

Table 29: Total Private Hospital Admissions 2004-2007 (NMDS)

DHBs Age	0-14	15-24	25-44	45-64	65-74	75+	Totals
Northland	2016	636	2759	5829	3752	3569	18561
Waitemata	1437	477	1974	2944	1621	1729	10182
Auckland	1875	493	2178	2859	1436	1516	10357
Counties Manukau	1130	430	1586	2549	1270	1139	8104
Waikato	2263	911	3271	5585	3907	4354	20291
Lakes	1014	466	2019	2787	1629	1548	9463
Bay of Plenty	1278	636	2513	4246	2999	3314	14986
Tairawhiti	721	327	1200	1750	877	946	5821
Taranaki	523	297	977	1791	1446	1604	6638
Hawkes Bay	1961	792	2461	4132	2504	2483	14333
Whanganui	1293	515	1745	2880	2225	2515	11173
Mid Central	795	500	1725	2403	1533	1744	8700
Capital and Coast	975	517	1497	1767	827	741	6324
Hutt	835	386	1734	2456	1297	1142	7850
Wairarapa	235	142	437	658	367	377	2216
Nelson Marlborough	440	362	1122	1583	1082	1451	6040
West Coast	180	160	694	1233	618	538	3423
Canterbury	1184	911	2706	3002	1474	1744	11021
South Canterbury	69	45	121	229	157	123	744
Otago	585	515	944	1555	1054	1558	6211
Southland	646	216	797	1082	713	613	4067
Totals	21455	9734	34460	53320	32788	34748	186505

Table 30: Public Elective Admissions 2004-2007 for Dep 8, 9, and 10 by Age Group (NMDS)

DHBs Age	0-14	15-24	25-44	45-64	65-74	75+	Totals
Northland	422	403	1240	2705	1129	1085	6984
Waitemata	242	229	669	688	186	143	2157
Auckland	477	594	1348	1103	286	139	3947
Counties Manukau	527	446	1219	1295	364	208	4059
Waikato	673	671	1883	3403	1316	1110	9056
Lakes	262	227	619	1585	585	611	3889
Bay of Plenty	204	173	642	1658	735	481	3893
Tairawhiti	51	50	175	604	262	340	1482
Taranaki	17	44	136	287	103	56	643
Hawkes Bay	132	105	415	868	295	326	2141
Whanganui	214	255	763	1476	612	489	3809
Mid Central	52	40	123	279	137	138	769
Capital and Coast	226	657	1472	1662	476	419	4912
Hutt	312	204	737	1148	505	367	3273
Wairarapa	64	46	144	365	164	146	929
Nelson Marlborough	83	112	349	547	162	141	1394
West Coast	40	34	110	217	65	38	504
Canterbury	653	650	1860	2956	1057	1205	8381
South Canterbury	61	51	166	381	136	119	914
Otago	187	628	627	915	304	278	2939
Southland	131	124	458	877	280	238	2108
Totals	5030	5743	15155	25019	9159	8077	68183

Table 31: Private Admissions 2004-2007 for Dep 8, 9, and 10 by Age Group (NMDS)

DHBs Age	0-14	15-24	25-44	45-64	65-74	75+	Totals
Northland	34,776	17,157	35,691	39,354	12,342	9,117	148,437
Waitemata	104,553	67,710	143,109	113,295	28,545	24,405	481,617
Auckland	76,092	67,251	136,179	86,322	19,758	19,011	404,613
Counties Manukau	112,110	65,115	124,065	93,648	22,113	16,032	433,083
Waikato	77,358	48,924	90,147	80,040	23,466	19,251	339,186
Lakes	23,862	12,459	26,685	23,607	6,579	5,127	98,319
Bay of Plenty	43,611	22,611	48,840	48,963	16,518	14,388	194,931
Tairawhiti	11,652	5,751	11,202	10,527	2,916	2,421	44,469
Taranaki	22,713	13,080	27,174	25,875	7,935	7,500	104,277
Hawkes Bay	34,098	18,210	38,058	37,341	10,914	9,624	148,245
Whanganui	13,800	7,851	15,219	15,558	5,151	4,641	62,220
Mid Central	33,924	24,090	40,902	37,578	11,946	10,398	158,838
Capital and Coast	30,843	18,483	39,084	32,244	8,298	7,146	136,098
Hutt	51,915	42,360	85,287	58,983	15,108	13,008	266,661
Wairarapa	8,151	4,221	9,093	10,830	3,363	2,961	38,619
Nelson Marlborough	25,773	14,688	34,086	36,342	10,140	9,039	130,068
West Coast	6,396	3,393	8,385	8,820	2,433	1,902	31,329
Canterbury	91,689	66,507	131,667	113,850	31,953	30,738	466,404
South Canterbury	10,506	5,805	12,987	14,865	5,055	4,662	53,880
Otago	31,914	31,728	45,150	44,742	13,431	12,435	179,400
Southland	21,813	13,743	31,128	26,349	7,491	6,309	106,833
Totals	867,549	571,137	1,134,138	959,133	265,455	230,115	4,027,527

Table 32: Age Structure for New Zealand's Population 2006 (by DHB)

DHBs Age	0-14	15-24	25-44	45-64	65-74	75+	Totals
Northland	20377	11663	19918	20973	7150	5681	85763
Waitemata	18388	11872	23337	14597	3959	3369	75522
Auckland	32103	26034	51192	28707	6989	5182	150207
Counties Manukau	59647	33914	59073	37556	9430	6388	206007
Waikato	27832	21380	29957	25611	8133	6715	119627
Lakes	13776	8613	14771	11772	3756	2880	55567
Bay of Plenty	20612	11054	20556	18843	6727	5659	83451
Tairawhiti	8215	4721	7479	6889	2096	1873	31272
Taranaki	17002	9873	17073	14553	4645	4065	67210
Hawkes Bay	5753	3701	6277	6747	2568	2381	27428
Whanganui	10920	8770	12158	11278	4618	4208	51951
Mid Central	8321	5538	8646	8290	2993	2808	36597
Capital and Coast	12325	12770	18892	10720	2715	1978	59400
Hutt	9736	5978	11704	8451	2268	1950	40085
Wairarapa	1650	978	1661	1667	597	445	6996
Nelson Marlborough	3610	2684	5090	3874	1271	1679	18207
West Coast	2492	1601	2919	3562	1247	1043	12863
Canterbury	15745	16354	26714	18414	5376	6191	88795
South Canterbury	1407	1217	1882	1985	893	1029	8414
Otago	4144	13997	7329	5890	2071	2558	35988
Southland	5597	3913	6756	6276	1959	1734	26234
Totals	299651	216624	353383	266653	81459	69816	1287584

Table 33: Age Structure of New Zealand's Population for Dep 8, 9, and 10 for 2006 (by DHB)

Appendix 4

Age Groups	Cases	Mean	Std. Deviation	Median
0-14	65809	123	164	72
15-24	28941	164	226	84
25-44	104602	157	226	81
45-64	151335	157	240	72
65-74	97873	152	227	73
75+	115051	142	214	70
All Ages	563611	149	222	74

Table 34: Age Group Summary of Waiting Times 2004-2006 (Days)

Appendix 5

	NZ Dep 2006 (Quintiles)					R^2 and P Values Based on Decile Scores		
DHB	Very Low	Low	Medium	High	Very High	Total	R^2 Value	P Value
Northland	84	87	84	86	88	86	0.312	0.093
Waitemata	57	59	60	62	66	60	0.886	**0.000**
Auckland	65	69	72	72	72	71	0.571	**0.011**
Counties Manukau	59	63	62	65	70	65	0.778	**0.001**
Waikato	68	64	66	69	73	69	0.346	0.074
Lakes	67	64	64	72	68	68	0.000	0.952
Bay of Plenty	61	66	68	68	53	63	0.108	0.354
Tairawhiti	64	56	65	54	63	63	0.137	0.328
Taranaki	64	67	68	72	67	70	0.195	0.202
Hawke's Bay	72	71	72	80	80	76	0.530	**0.017**
Whanganui	50	63	59	57	55	56	0.024	0.668
Mid Central	77	76	73	76	83	77	0.013	0756
Hutt Valley	91	108	104	104	109	103	0.542	**0.015**
Capital and Coast	94	97	103	99	102	99	0.324	0.086
Wairarapa	59	69	66	67	63	66	0.009	0.805
Nelson Marlborough	79	80	80	83	80	82	0.276	0.119
West Coast	79	85	73	78	87	80	0.286	0.111
Canterbury	83	84	83	86	91	85	0.549	**0.014**
South Canterbury	75	71	72	75	83	74	0.140	0.361
Otago	80	85	83	84	78	83	0.849	**0.005**
Southland	77	77	72	79	77	77	0.010	0.786
New Zealand	71	73	74	75	74	74	-	-

Table 35: Median Waiting Times by Deprivation 2004-2007 (Days)

Appendix 6

Deprivation	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
1 Very Low	70	76	60685	4414
2 Low	72	78	74545	6916
3 Medium	73	77	92427	12401
4 High	74	78	114964	22896
5 Very High	71	77	80686	50382
Total	72	77	423307	97009

	European		Maori Pacific	
Deprivation	25th Percentile	75th Percentile	25th Percentile	75th Percentile
1 Very Low	28	178	31	173
2 Low	28	178	31	181
3 Medium	29	178	31	180
4 High	29	181	31	182
5 Very High	28	176	31	182

Table 36: European and Maori/Pacific Median Waiting Times and 25th and 75th Percentile by Dep06 2004-2007

Urban Rural Classification	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
Main Urban	72	78	278098	70272
Sec Urban	68	74	44273	6060
Minor Urban	74	77	49702	10414
Rural Centre	77	78	11220	2865
Other Rural	73	80	39956	7395
Total	72	77	423249	97006

Urban Rural Classification	European 25th Percentile	75th Percentile	Maori Pacific 25th Percentile	75th Percentile
Main Urban	29	177	32	78
Sec Urban	27	170	29	74
Minor Urban	29	181	29	77
Rural Centre	29	189	27	78
Other Rural	28	181	29	80

Table 37: European and Maori/Pacific Median Waiting Times and 25th and 75th Percentile by Urban Rural Classification 2004-2007

Urban Rural Classification	Very Low (Quintile 1)	Very High (Quintile 5)	N (Quintile 1)	N (Quintile 5)
Main Urban	71	75	53215	99051
Sec Urban	68	62	3413	10153
Minor Urban	78	75	2234	23213
Rural Centre	77	75	608	3825
Other Rural	72	78	11948	4422
Total	71	74	71444	140674

Table 38: NZ Dep 06 High and Low Deprivation Median Waiting Times by Urban Rural Classification 2004-2007

Deprivation	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
1 Very Low	69	34	205	48
2 Low	54	59	810	128
3 Medium	64	71	1072	371
4 High	43	61	161	152
5 Very High	60	70	3124	2972
Total	60	69	5372	3671

Table 39: Tairawhiti DHB: Waiting Times by Dep2006 European versus Maori Pacific Populations

Deprivation	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
1 Very Low	57	66	6409	578
2 Low	58	75	2381	356
3 Medium	58	76	6356	1421
4 High	60	69	3157	1584
5 Very High	60	75	8326	14593
Total	58	74	26629	18532

Table 40: Counties Manukau DHB: Waiting Times by Dep2006 European versus Maori Pacific Populations

Deprivation	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
1 Very Low	76	71	988	35
2 Low	70	87	2087	70
3 Medium	70	76	2893	111
4 High	73	98	3599	229
5 Very High	81	99	825	27
Total	72	85	10392	472

Table 41: South Canterbury DHB: Waiting Times by Dep2006 European versus Maori Pacific Populations

Deprivation	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
1 Very Low	79	105	2515	95
2 Low	80	92	7133	376
3 Medium	79	83	6510	330
4 High	82	101	8334	716
5 Very High	80	93	1510	142
Total	81	94	26002	1659

Table 42: Nelson Marlborough DHB: Waiting Times by Dep2006 European versus Maori Pacific Populations

Appendix 7

Gender	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
F	56	66	2763	2063
M	64	70	2609	1607
U	0	103	0	1
Total	60	69	5372	3671

Table 43: Tairawhiti DHB: Waiting Times by Gender, European versus Maori Pacific Populations

Gender	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
F	59	72	14193	10961
M	58	76	12440	7571
U	0	6	0	1
Total	58	74	26633	18533

Table 44: Counties Manukau DHB: Waiting Times by Gender, European versus Maori Pacific Populations

Gender	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
F	65	75	6908	3047
M	65	71	5103	1913
Total	65	73	12011	4960

Table 45: Lakes DHB: Waiting Times by Gender, European versus Maori Pacific Populations

Gender	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
F	73	82	6140	280
M	71	95	4252	192
Total	72	85	10392	472

Table 46: South Canterbury DHB: Waiting Times by Gender, European versus Maori Pacific Populations

Gender	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
F	79	91	13715	1039
M	82	107	12289	620
Total	81	94	26004	1659

Table 47: Nelson Marlborough DHB: Waiting Times by Gender, European versus Maori Pacific Populations

Gender	European Median	Maori and Pacific Median	N (European)	N (Maori/Pacific)
F	62	56	3558	563
M	71	76	2952	396
Total	66	64	6510	959

Table 48: Wairarapa DHB: Waiting Times by Gender, European versus Maori Pacific Populations

Appendix 8

	Median Waiting Times		European Population			Maori and Pacific Island Population		
DHB	European	Maori-Pacific	Admissions	Population	Admission Rate/1000	Admissions	Population	Admission rate per 1000
Northland	83	96	12190	97740	125	1253	51905	24
Waitemata	57	68	28477	424090	67	1411	85530	16
Auckland	68	71	21635	360610	60	1514	87590	17
Counties Manukau	58	74	14492	279770	52	1526	166910	9
Waikato	67	78	30938	258400	120	1434	83630	17
Lakes	65	73	9175	64950	141	729	38750	19
Bay of Plenty	63	63	15361	149910	102	750	54630	14
Tairawhiti	60	69	2789	21830	128	223	23080	10
Taranaki	70	71	1561	87550	18	104	17545	6
Hawkes Bay	76	77	9700	107420	90	315	42730	7
Whanganui	56	56	9387	47030	200	448	17275	26
Mid Central	76	87	1717	134850	13	92	31950	3
Capital and Coast	100	112	36823	223130	165	1325	50760	26
Hutt Valley	97	102	16388	104690	157	954	33520	28
Wairarapa	66	64	3564	32250	111	124	6835	18
Nelson Marlborough	81	94	7532	123530	61	204	13410	15
West Coast	80	79	1318	27220	48	46	2870	16
Canterbury	84	91	59652	427070	140	1067	43760	24
South Canterbury	72	85	4333	49990	87	49	3600	14
Otago	81	106	17772	167030	106	530	14450	37

Table 49: Ethnic Differences when Comparing Public Hospital Waiting Times with Private Hospital Admissions

	Median Waiting Times		Affluent Population (NZ Dep 2006 1 to 5)			Deprived Population (NZ Dep 2006 6 to 10)		
DHB	1 to 5	6 to 10	Admissions	Population	Admission Rate/1000	Admissions	Population	Admission rate per 1000
Northland	85	86	2830	30077	94	9359	119568	78
Waitemata	58	62	21108	334995	63	7358	174505	42
Auckland	69	72	13868	225904	61	7763	220975	35
Counties Manukau	61	68	9251	170422	54	5235	276258	19
Waikato	66	70	14504	117158	124	16401	224872	73
Lakes	68	68	3641	38943	93	5534	64757	85
Bay of Plenty	66	62	5821	51444	113	9529	152810	62
Tairawhiti	62	63	1189	8396	142	1599	36514	44
Taranaki	71	80	759	32060	24	800	73035	11
Hawkes Bay	66	70	3004	56144	54	6693	93241	72
Whanganui	75	78	4215	20700	204	5172	43605	119
Mid Central	56	56	537	66383	8	1180	100417	12
Capital and Coast	97	103	27287	177176	154	9516	96714	98
Hutt Valley	98	105	9482	60636	156	6906	77574	89
Wairarapa	64	66	1072	12615	85	2492	26470	94
Nelson Marlborough	81	82	4251	67237	63	3280	69703	47
West Coast	78	82	424	10322	41	892	19768	45
Canterbury	83	88	40771	296511	138	18880	174319	108
South Canterbury	72	75	2366	30544	77	1967	22950	86
Otago	82	84	10412	96970	107	7346	84510	87

Table 50: NZ Dep 2005 Differences when Comparing Public Hospital Waiting Times with Private Hospital Admissions

Appendix 9

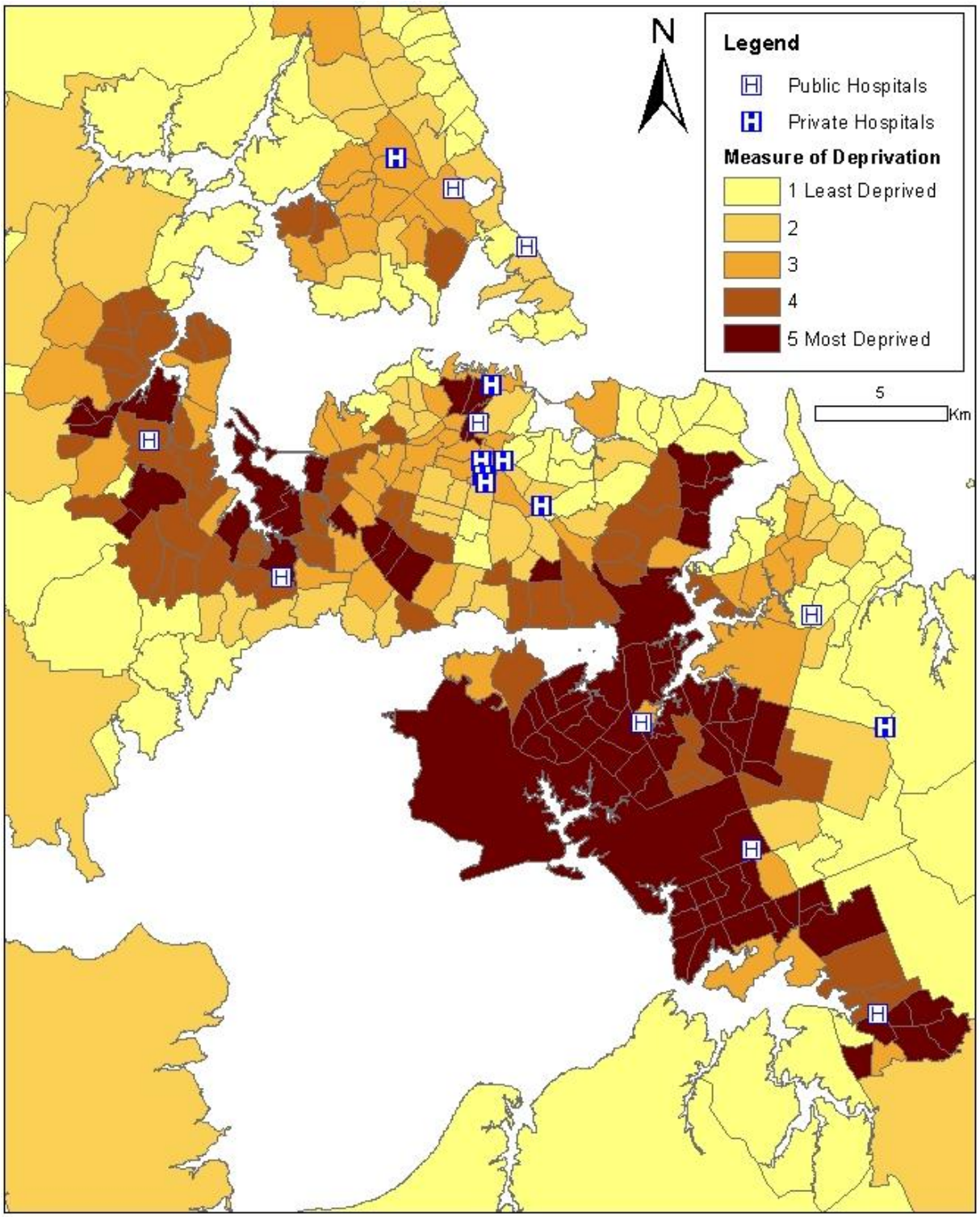


Figure 62 Auckland Region Hospital Network overlaid on NZ Dep2006 Map

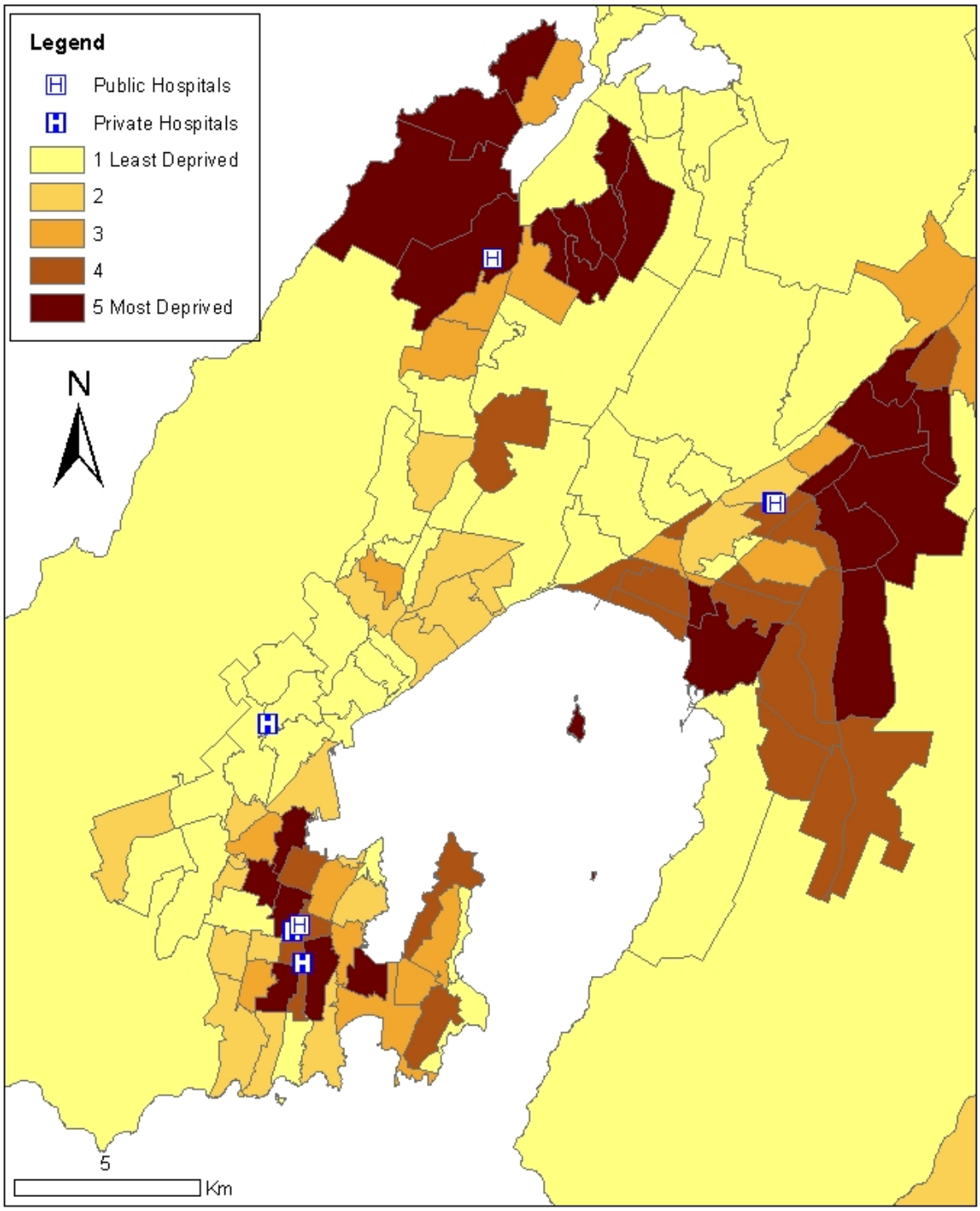


Figure 63 Wellington, Porirua and Hutt Valley Hospital Network overlaid on NZ Dep2006 Map

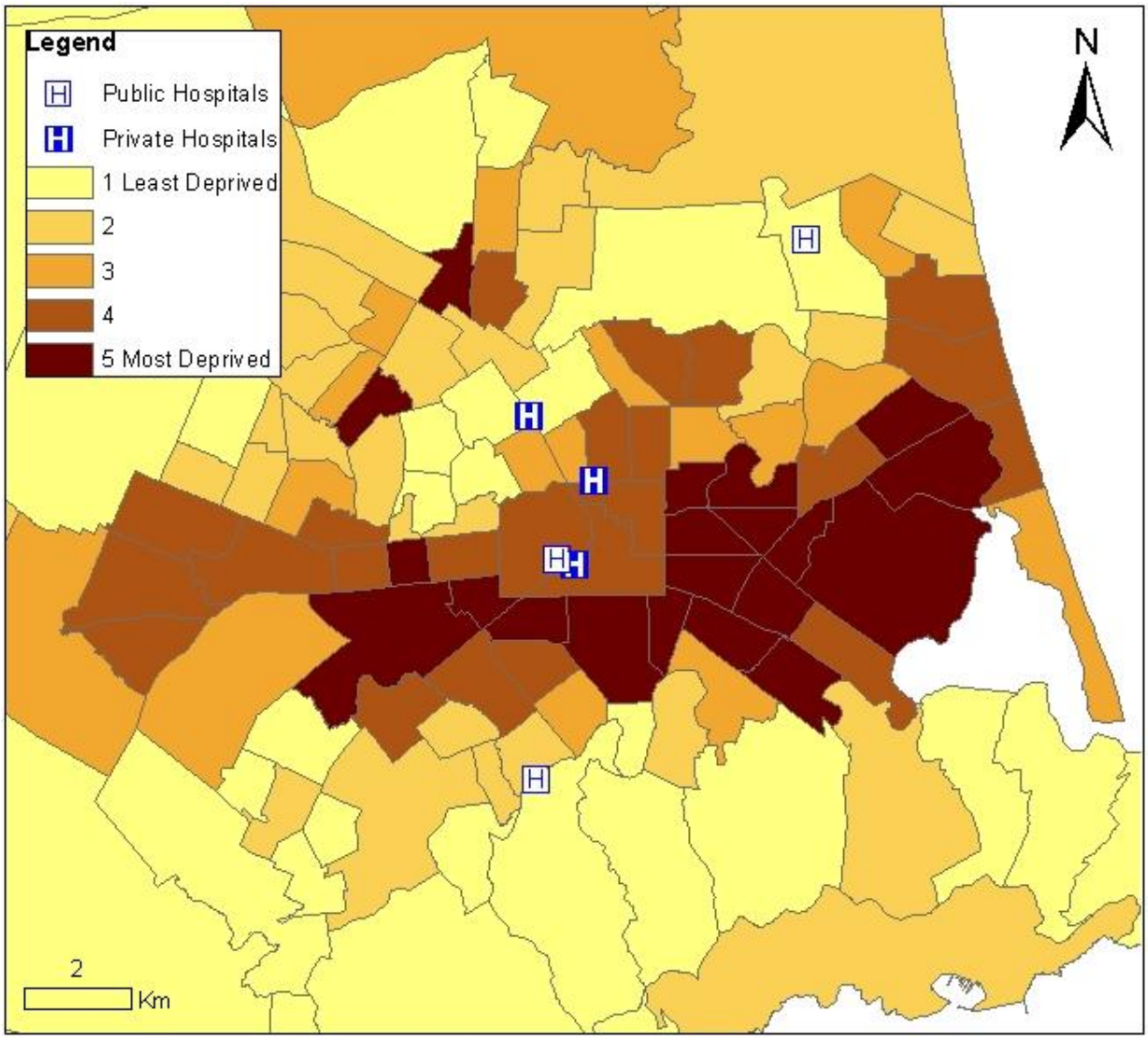


Figure 64 Christchurch City Hospital Network overlaid on NZ Dep2006 Map

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